Heating Piping & Air Conditioning

with which is merged the Aerologist

Design, Installation,
Operation, and Maintenance:
Industrial, Commercial, Institutional,
and Public Buildings

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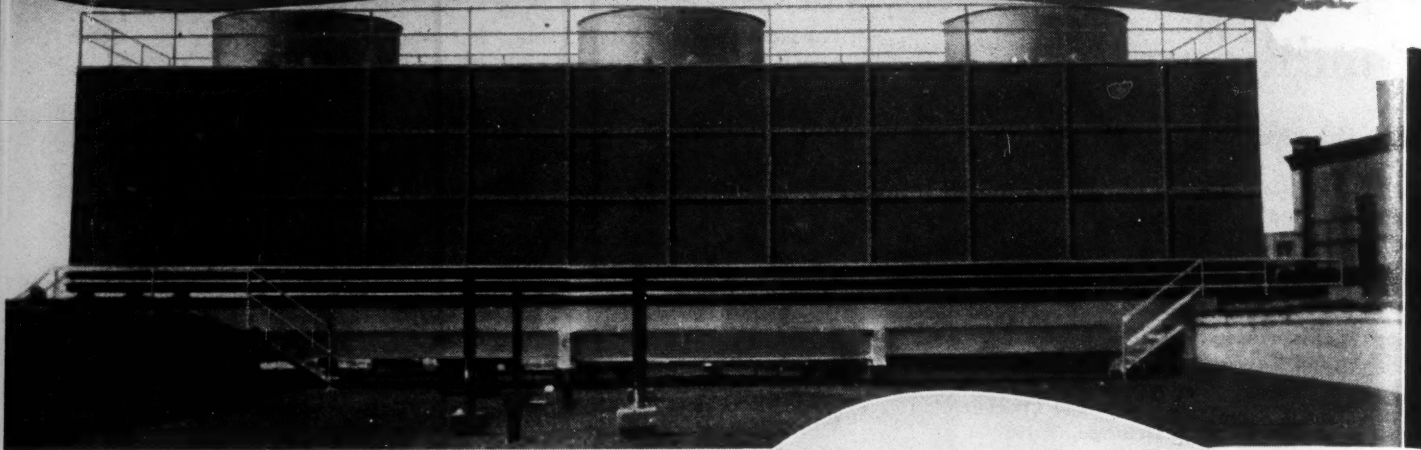
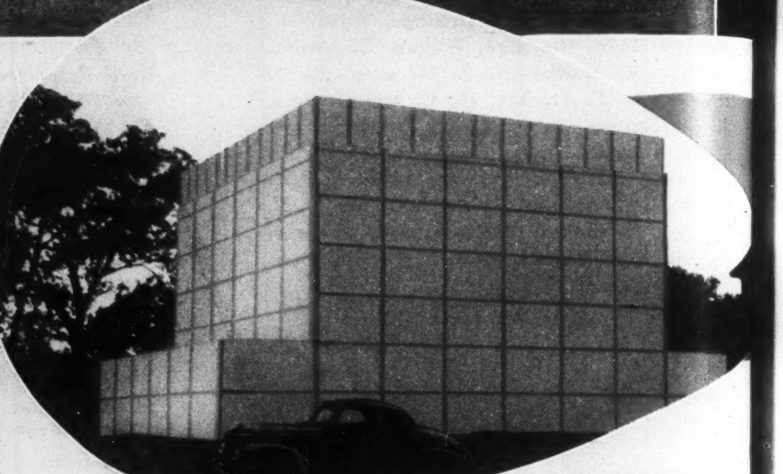
Pritchard COOLING TOWER



All-steel, Transite sheathed, fire-proof tower installed in New Orleans. Conventional counter-flow design.



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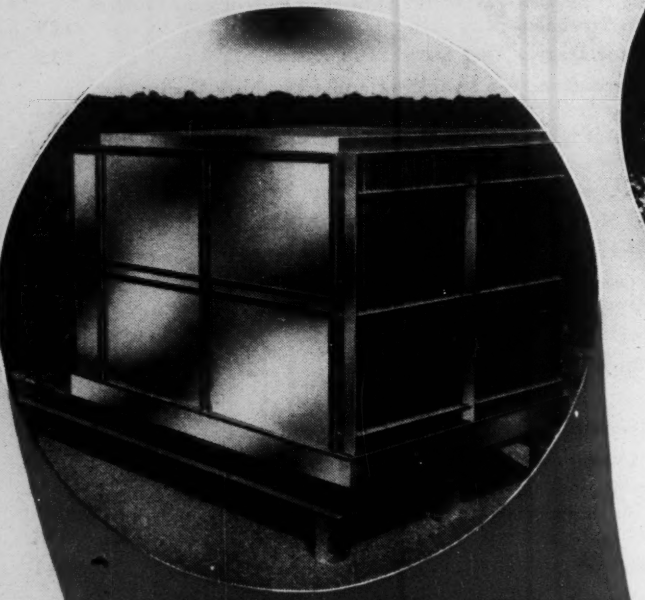

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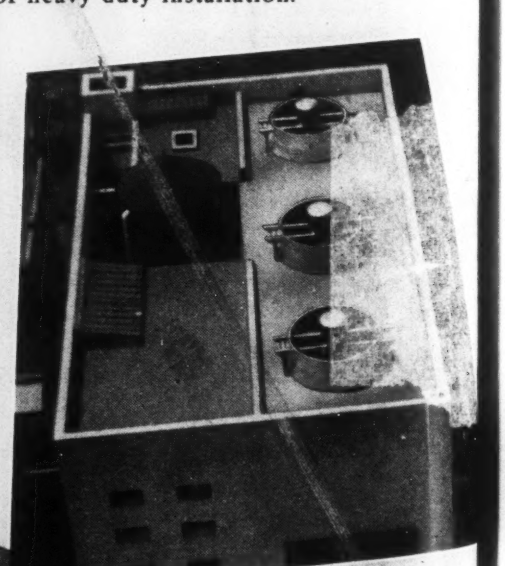

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THE EDITOR'S PAGES

SEES MODERATE DECLINE N PRIVATE BUILDING

Building and engineering volume estimates for 1949 released by F. W. Dodge Corp. indicate that moderate declines in physical volume of private residential and nonresidential building and moderate increases in public building and engineering projects are likely this year.

On the basis of present information available to the corporation, it appears that the number of dwelling units to be built in 1949 will be 7 percent less than in 1948.

FIGHT INFANTILE PARALYSIS

Other classifications of building for which declines are anticipated are: commercial buildings, 9 percent; manufacturing buildings, 15 percent; churches and other structures used for religious purposes, 19 percent; social and recreational buildings, 14 percent.

It is expected, however, that there will be increases in educational and science buildings by 10 percent, and in hospitals and institutional buildings by 11 percent.

SUFFICIENT MATERIALS, LABOR PRODUCERS SAY

The supply of both building materials and labor is expected to be sufficient for the $18.1 billion of new construction and $7 billion of repair and maintenance estimated for 1949, according to a forecast prepared by the Producers' Council, national organization of building product manufacturers.

Aside from the supply of iron and steel, where the outlook is complicated by the unknown extent and character of the defense program, no serious shortages of materials are expected during 1949, the council says.

The extreme tightness of the labor supply, which has made premium and overtime payments a feature of the construction picture since the end of the war, should be much eased during 1949. The continuance of a large volume of construction plus some inroads on the labor force by the draft, should, however, prevent any surplus of labor from arising. Even the slight reduction in demand that is anticipated in certain classes of construction should permit the retirement of older workers and the weeding out of some of the less competent among the younger men, according to the forecast.

DOES FLOOR COVERING AFFECT PANEL HEAT?

Although a comprehensive investigation of panel heating now under way will include careful study of the effects of various floor coverings, the project has not developed any data on this matter which are now ready for release, according to an engineer who was asked to reply to a question on this matter posed by a reader of HPAC. His comments are given here.

"It is our opinion that the effect of emissivity of floor covering is negligible," he said. "The emissivity for floors (whether they be bare wood, bare concrete, cork, or asphalt tile or any such material) is likely to be very nearly the same. If someone were to try to use aluminum foil as floor covering, then the effect of emissivity might become important. It is possible that the effect of a deep nap rug might be measurable, but probably not of any great importance.

"The factor which would seem to be of much greater importance is the overall thermal resistance between the imbedded tube and floor surface. In this, of course, the thickness and the thermal conductivity of the flooring material must be considered. As the thickness of the floor covering increases and its thermal conductivity decreases, the water temperature in the tubes must be increased to maintain a given floor surface temperature," he remarked.

TWO EDITORIAL FEATURES APPEAR THIS MONTH

1) **Annual Directory Section of Heating, Piping, and Air Conditioning Equipment for Industrial, Commercial, Institutional, and Public Buildings.**

2) **Show Section with complete information on the Air Conditioning Exposition—the Ninth International Heating & Ventilating Exposition—and the 55th annual meeting of the American Society of Heating and Ventilating Engineers, to be held in Chicago the last week of January.**

These features are in addition to HPAC's regular editorial content, including the Journal Section of the American Society of Heating and Ventilating Engineers.

AIR CONDITIONING AND REFRIGERATION SALES UP

The commercial and industrial refrigeration and air conditioning industry's production employment has shown a steady increase, with dips during the war years, and now stands at over 57,000, 63 percent more than in 1937. The industry's volume of materials usage has likewise shown heavy increases, with steel requirements alone reaching almost 250,000 tons in 1948. (These requirements do not include requirements for household refrigeration, a quite separate and very large industry.) The industry sales curve has surged to a new high point in terms of dollars. In the year 1948, sales of refrigerating and air conditioning equipment, of course excluding household refrigerators, approximated $220,000,000 of factory billings.

Shipments of comparable equipment in 1940 were valued at $55,000,000—thus there has been an increase of 400 percent. However, the 1948 dollar was but a pale reflection of its 1940 counterpart. Therefore, to appraise this large increase in sales in proper perspective, we use, as an adjustment factor, the Bureau of Labor Statistics index of wholesale prices for the metal and metal products group. Using that means, we find that the actual increase in dollar sales, 1948 over 1940, was 225 percent. Given normal material supply and production conditions in 1948, the unit sales volume could easily have been doubled.—*From a talk by William B. Henderson, executive vice president, Air Conditioning and Refrigerating Machinery Association.*

THE EDITOR'S PAGES

SBI STRESSES VALUE OF CODES, RATINGS

Shortage of steel plates, importance of boiler ratings, means of rating and selecting tankless heaters for domestic water, the fuel oil situation, and the future of gas and electric heating were among the subjects discussed at the fall meeting of the Steel Boiler Institute.

The protection afforded to installers, to purchasers, and the general public by the ASME boiler code and SBI ratings was emphasized at the meeting. That every steel boiler installed should be a code boiler was cited as one of the long-range objectives of the SBI.

Despite the handicap of the shortage of steel plates and boiler tubes, production of steel boilers for the first six months of 1948 was ahead of the output for the corresponding period during '47, R. A. Locke, manager of the institute, reported to the convention. He pointed out that steel boilers made by members of the SBI are used for power and process purposes as well as the heating of various kinds of commercial, institutional, and industrial buildings.

WHY ACRMA OPPOSES CONTRACTOR LICENSING

There are other means of obtaining the advantages claimed for contractor licensing which are simpler and less expensive to the municipality or state, which provide more revenue, and which are simpler and less expensive to the contractors and their customers, said William B. Henderson, executive vice president of the Air Conditioning and Refrigerating Machinery Association, in presenting "the case against contractor licensing." Speaking at the third annual convention of the National Association of Refrigeration Contractors which met in Chicago, Mr. Henderson said these other methods are less discriminatory as between contractors of different sizes, and are entirely adequate from the point of view of safety, fire prevention, and health. He summarized them as

a) Inspection of installations by municipal, state, fire insurance, or other inspectors.

b) Education of contractors and the public on fire prevention, safety, and health—a normal function of such inspectors.

c) Fining contractors for violation of inspection laws.

d) Where necessary, use of the injunction procedure against contractors who violate an inspection ordinance or law.

He said that he is opposed to contractor licensing in the air conditioning and refrigeration industry because

a) Licensing of contractors tends to limit free and competitive enterprise and create barriers to interstate and intercommunity commerce. This would be true even if licensing were capable of being perfectly administered, which it is not.

b) Inherent in contractor licensing is the opportunity for abuses such as the limiting of competition by excessive fees, through unreasonable requirements, and through administration by examining boards and enforcement agencies which may be less than impartial.

c) Contractor licensing opens the door to illegal practices by existing contractors in the form of agreements and understandings or concerted action to fix prices, divide territories, and otherwise control the market for their services.

d) Licensing charges must be reflected in higher overall costs of air conditioning and refrigeration installations to the buyer, without any assurances of quality of equipment, proper installation, and safe operation of air conditioning and refrigeration installations.

e) Contractor licensing will be, as it has been in other businesses, a retarding influence on the growth and progress of the industry, through limiting the competitive spur to render better service at lower prices.

f) There are alternatives to contractor licensing which are more effective and subject to less abuse. A system of installation permits and inspection, well-conceived and impartially administered, is much to be preferred to contractor licensing from all viewpoints—that of the public, the municipal and state authorities, and the industry as whole.

EXPAND PIPE STORAGE OF NATURAL GAS

Just two years ago the Public Service Co. of Northern Illinois completed its first installation of underground storage of natural gas in buried pipe near Kankakee. Its capacity was 1,250,000 cu ft. During 1947 and 1948, the company has increased its underground storage in service to more than 95,000,000 cu ft, all at 2240 psi pressure. In addition to the Kankakee storage, the company now has 74,000,000 cu ft capacity installed near Mt. Prospect and 20,000,000 cu ft near Matteson.

Another 46,000,000 cu ft is expected to be added during 1949 at the Mt. Prospect site. Thus, by the end of 1949 the present 95,000,000 cu ft in service will be increased to more than 141,000,000 cu ft. An additional 30,000,000 cu ft is either in service or under construction by other companies, mostly in the Chicago area.

A paper by D. V. Meiller in the May 1948 HPAC described the reasons for and methods of utilizing high pressure storage of natural gas in underground pipe sections.

15 Years Ago

Plans for the revision of the American Standard Code for Pressure Piping were reported on page 75 of the December 1948 issue, and it is interesting to note that back in January 1934, HPAC published an article on The New Code for Pressure Piping—a "preview" by Sabin Crocker. His discussion continued a series on piping standardization which began the previous September.

* * * * *

Indicative of the general public interest in air conditioning, as reported in the January 1934 HPAC, was the fact that one of the big metropolitan daily newspapers had an air conditioning editor on its staff and a department on air conditioning was a regular editorial feature.

"OPEN for DISCUSSION"

DO YOU HAVE something to say about any of the articles published this month? An additional comment, or perhaps a question on some point? We follow here the custom of engineering society meetings in allowing a period for discussion following presentation of a paper. You are invited to contribute your views. Address them to the Editor, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Illinois.

ESTIMATING PERFORMANCE OF WATER COOLING TOWERS

REFERRING TO THE article How to Estimate Cooling Tower Performance, by Tyler G. Hicks, in the December HPAC, we have checked the data and results given in this article and find them to be somewhat in agreement with towers manufactured by this company. Mr. Hicks has evidently based his calculations on the "conventional" counterflow (induced draft) type of water cooling tower.

The author makes the statement that "Extensive experience has indicated that for a given area, good performance is obtained when the water concentration is in the range of 2 to 3.5 gpm per sq ft." Exception is taken to the term "good performance" because a cooling tower is expected to meet specified conditions regardless of the water concentration. The amount of water a tower will cool depends upon its design; cooling towers are made to handle water loadings beyond (below and well above) Mr. Hicks' limits. As little as 1 gpm per sq ft could be supplied with a long cooling range and close approach, or as much as 10 gpm per sq ft with a small range and long approach.

For the given conditions of 1400 gpm of water with 10 F cooling range and 7 F approach, we would recommend the crossflow arrangement at lower price with subsequent reduced operating costs as compared to the counterflow design. It is realized that the values given in the article are approximate, but this recommended tower would use only a 20 ft height instead of 30 ft and a 20 hp motor instead of the 25 hp selected by Mr. Hicks, but a somewhat larger plan area. With the counterflow design, we would estimate a tower height of 25 ft and a 20 hp motor to drive the fan.

Concerning the paragraph on nozzles, I think Mr. Hicks means to use nozzles that have an inlet pipe size of 1 in. with a delivery orifice of about 7/16 in. diameter for 10 psi water pressure at 10 gpm delivery per nozzle. Further, we prefer to use the term "drift" instead of "windage loss" as used in the article, also "water cooling tower" instead of "cooling tower."

Because of the many variables in water cooling tower calculations and operation, it is difficult to provide simple equations, tables, and alignment charts whereby anyone could readily select the type and size of unit for a definite requirement. Each manufacturer has a semi-confidential method of sizing a tower, based largely upon research and actual performance correlated with desired conditions; selection of water cooling equipment for any specified service must ultimately depend upon overall considerations established from reliable design and performance data.

I hope that you will send us some reprints of the article.—HOWARD E. DEGLER, technical director, The Marley Co., Kansas City, Kans.

THE DATA presented by Tyler G. Hicks in Table 1 of his article on estimating cooling tower performance in the December HPAC indicate that it is possible to cool water through a 10 deg cooling range with a 0 deg approach to the wet bulb temperature, when the water concentration is 1.25 gpm per sq ft. Actually, this is a physical impossibility. No commercial cooling tower is capable of cooling water to the wet bulb temperature; it can only approach it.

A statement that is not necessarily true is made where Mr. Hicks states, "This is a maximum heat load that can be safely assumed for the tower at the designed wet bulb." This is not necessarily true. A tower could handle twice the heat load; however, the approach to the wet bulb temperature would suffer.

The estimated weights of an induced draft tower are given by Mr. Hicks in his Table 3. These values are indeed rough. They could be as little as one-third, or as much as three times the quoted figures, depending, of course, upon the cooling conditions involved. Mr. Hicks states that the water concentration will vary from 1.25 gal per sq ft to 4.0 gal. Certainly, then, a tower which is to be designed to cool 1100 gpm could cover 800 sq ft of ground area, or only 275 sq ft. A tower of 800 sq ft ground area would have several times the weight of a tower with only 275 sq ft. I think Mr. Hicks would do well to base the estimated weight on a square footage basis rather than on the water quantity.—JAMES G. DE FLON, district engineer, The Fluor Corp., Ltd., Los Angeles.

REPLY BY AUTHOR—Values for Table 1 of my article were obtained principally from published data of three manufacturers of cooling towers. One set of data which gave the closest approach to the wet bulb was used for checking all the values in the table. These data show that for the wet bulbs given, temperature of water off is so close to prevailing wet bulb that it may be considered equal to it for *preliminary* estimates.

Assumption of any heat load greater than design value, while permissible, is generally not advisable because the air conditioning designer does not have comprehensive performance figures on hand at all times. Hence, the safe, conservative assumption is the design heat load value until such time that the tower manufacturer says that it may be exceeded. Few designers will go so far as to say that a tower will handle twice its design load without first obtaining a verification from the manufacturer.

Tower weights, in general design data available to the air conditioning designer, are based on gpm and not area. In other words, with a given gpm one enters a table and finds the tower weight. A random check with a prominent manufacturer's data shows that a 1000 gpm tower has a dry weight of 36,000 lb

"OPEN for DISCUSSION"

as compared with the 35,000 lb for the 1100 gpm unit in Table 3 of my article. Another check with another manufacturer's unit, which was not used in preparation of Table 3, shows that a 300 gpm tower weighs about 12,000 lb when dry. A check with the table shows that the results agree fairly well.

Mr. De Flon's criticisms are entirely justified from the standpoint of cooling tower design. However, the air conditioning designer in the usual consultant's or contractor's office is more interested in what a particular type of tower will do for his job, than in how the builder arrives at certain values. The article was written with the air conditioning designer in mind and was directed at him. No doubt, a far better method of presentation could be derived. The method presented has been used with good results and found to save time. Saving of design time and fairly accurate results were the main objectives when the method was devised.—**Tyler G. Hicks**, mechanical designer, Hicks Associates, New York City.

BURNING OIL IN SCOTCH TYPE BOILERS

In reply to Kalman Steiner's comments in the "Open for Discussion" pages in December, there are many manufacturers of scotch type internal furnace boilers that burn oil successfully and efficiently without dutch ovens or refractory linings in the combustion chamber. Any trade magazine will disclose advertisements for several of these. I am familiar with their records over many years of operation.

Mr. Steiner objects to my English. I like to apply unusual adjectives, perhaps as a clumsy emulation of the humor of Mark Twain. Anyway, Webster says that to contaminate is "to soil, stain or corrupt by contact; to pollute." I didn't write a word about potability and I think that any H_2O that is not good for a steam boiler fairly is a contaminated water.

I think that my old friend Steiner was in no mood to succumb to my humor about "part-time." He possibly didn't understand that I was building up a case in my own mind in favor of the modern, oil burning, self-contained, "package unit" scotch boilers.—**Samuel R. Lewis**, Samuel R. Lewis and Associates, engineers, Chicago.

REDUCING SCALE ON EVAPORATIVE CONDENSERS

Regarding my "armchair analysis" of scale formation on evaporative condenser coils on page 109 of the October HPAC, I want to expand it a little, since it has been somewhat misinterpreted.

Much is made of the fact that the surface coefficient of a gas is less than that of a condensed liquid in discussing coil temperatures in evaporative condensers. The conditions encountered by evaporative condensers are many and vary greatly so that any specific discussion will have to be confined to definite limits. The gas film coefficient and corresponding surface temperature of the upper coils is a function of the velocity, temperature, and pressure of the gas. In cases where the wet bulb temperature is quite low, all coils may have a film of condensing refrigerant on the inside with a corresponding increase of surface heat transfer coefficient. In the lower portion of the condenser the liquid may even be considerably subcooled at times.

As spray water travels down through the coils, more of it evaporates and the mineral concentration thus becomes greater. As the mineral concentration becomes greater in the reservoir water, this higher concentration of mineral in water falling over the lower coils becomes critical. It is at this point in the system that precipitation is most probable.

In the October issue, I suggested that additional sprays near the intermediate and lower coils be used only as a positive and more efficient means of wetting coil surfaces t prevent the solubility product o mineral from being exceeded an causing precipitation—but not fo the purpose of cooling, as some hav understood.

Following along with the abov reasoning (in the best armchai tradition) and with due respect t D. D. Wile (who commented on th matter in the November HPAC) i seems to me if a desuperheating coi is placed in the intake air stream o an evaporative condenser to warn up the air as it hits the low coils scale formation can be considerabl reduced if not eliminated—except i extreme cases of very high minera concentration. This is particularl true where the liquid in the lowe coils is subcooled and the relativel cool coil causes the mineral concentration in the cooling water to exceed its solubility product at tha temperature and form scale.

In this manner, the lower coils would be warmer and mineral kept in solution more so than at lower temperatures. The effect of lowering the relative humidity of the air would be compensated by an increase of wet bulb temperature. It seems to me that whether a desuperheating coil is placed in the inlet or outlet air stream it has the same effect as more tube surface, resulting in the lower pressures and temperatures which would reduce scale formation.

The important thing in scale prevention, I think, is to keep the mineral concentration in the spray water at the bottom coils as near that of the water in the bottom pan as possible—and from my point of view, this is accomplished to a great degree by desuperheating coils and additional sprays as mentioned.—**O. Germany**, Airtemp engineer, export div., Chrysler Corp., Detroit.

* * * * * *

HPAC INDEX FOR 1948 IS AVAILABLE ON REQUEST

An index for our 1948 issues, Vol. 20, Nos. 1-12, including the Journal Section of the American Society of Heating and Ventilating Engineers, is being compiled and will be available soon to HPAC's subscribers on request. If you want a free copy, send a note or postcard to The Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

HOW TO ERECT
High Temperature, High Pressure
PIPING

ARTHUR GOULD, construction engineering, The Detroit Edison Co., outlines procedures which have been found to be of marked benefit in overcoming many of the difficulties encountered in the erection of welded, high temperature, high pressure piping systems. The higher pressures and temperatures used these days add to the importance of correct piping erection methods

Continuing rise of pressures and temperatures in steam power and oil refinery practice has increased the importance of correct piping erection. In addition, the higher temperatures and pressures encountered have magnified the erection problem, and the use of welded construction has been a complicating factor.

For the purpose of this discussion, piping for service above 700 F will be considered as high temperature piping; although everything said here applies equally to piping at lower temperatures, ordinary erection procedures (except in special cases) are adequate since the expansions involved are lower and the allowable stresses in the piping are considerably higher.

Let us first briefly compare welded and flanged joint piping construction, next discuss in detail the elements that contribute to erection difficulties of the former, and then present a procedure properly to erect welded systems.

Erection Problems With Welded Joints

Welded joints are used almost universally for high temperature installations, and make for an economical piping system. In erection, however, flanged joints have a number of advantages over welded joints. The gaging surfaces of the former are much more liberal; compare, for example, the definite face of a flange with the 1/16 in. lip of a welded joint, or the finished outside diameter of a flange with the relatively uneven scaled surfaces of a pipe. In addition, contrast the effectiveness of the face of a flanged joint as a measure of squareness with that of a backing ring or lip edge of a welded pipe. One can readily judge, from the above, that a considerable amount of "indefiniteness" has been introduced into the erection procedure for a welded line as compared to a flanged line.

With flanged joints for intermediate pressures of the van stone type, it is possible to correct for minor discrepancies in structure, location of equipment, or in piping detail by merely rotating the pipe about the flanges.

Flanged joints have an additional advantage from the erection men's viewpoint. A flanged piping system subjected to high stresses will invariably leak at flanges located at points of high moment. This provides an automatic check on both design and erection.

Length of Piping Runs Increased

The length of unanchored or unguided piping runs between high temperature equipment has tended to increase. This is due to a number of factors, such as the larger physical size of boilers, turbines, etc., increased expansion values, and lower permissible combined stresses. The lower stress allowances are due to the inability of the commonly used materials to withstand high stresses at elevated temperatures and the desire to keep the stresses sufficiently low so that creep rates will be reasonable.

These longer runs add to the complexity of the problem. The longer runs used, multiplied by the larger coefficients of expansion, now require considerable numbers of constant load or roller hangers in order to allow for the movements mentioned above, without imposing any additional bending stresses due to load transfer between hangers. Of course, the longer runs and the special hangers make erection very sensitive.

Cold Springing Adds to Problem

Cold springing a system adds to the magnitude of the erection problem. While the amount of cold spring increases with the changes mentioned above, the desire to reduce stresses under operating conditions has led to increasing the

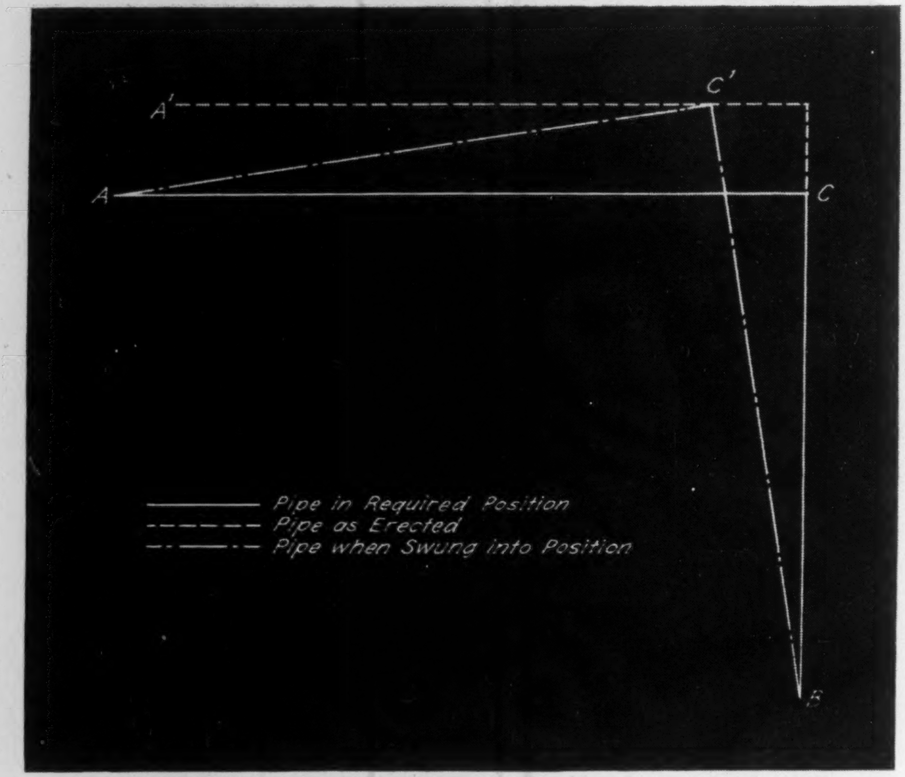

A'
C'
A
C
B
——— Pipe in Required Position
– – – – Pipe as Erected
–·——·– Pipe when Swung into Position

Fig. 1—Pipe line in a horizontal or a vertical plane. Any reasonable error perpendicular to the plane of the paper can be corrected by rotation about *AC* or *BC*

percentage of cold spring. Most engineers and fabricators now cut the pipe short an amount equal to 66-2/3 percent of the expansion as against the 50 percent value previously used, and some engineering offices recommend using 100 percent cold spring.

Obtaining the designed cold spring in erection is particularly important in high temperature piping, for the design computations are based on the cold spring allowances. This is especially true in cases where thrusts and moments on superheater outlets or turbine flanges are restricted to rather low values by equipment manufacturers. In addition, where space is limited, designed cold spring must be obtained, or interference of the piping with the structure or equipment may occur.

Long Runs Must "Float in Space"

The fact that high temperature piping material is expensive influences designers to eliminate expansion loops and to use the normal run of piping with a minimum of offsets to absorb the thermal stresses. This frequently means that an entire line must be capable of floating in space. Two-hundred foot runs of floating pipe between anchors or equipment are not uncommon. The sensitivity of such an arrangement to erection errors may well be imagined.

General Method of Erecting Flanged Piping

Let us now briefly review the general method of erecting flanged joint systems. The piping is erected, beginning at the anchored ends and proceeding inward to the center where the line is pulled the amount of the cold spring allowance, preferably close to points of inflection. (That is, at a point where the bending moment is zero). However, if inaccuracies in structure or equipment have caused poor closure (i.e., cold spring allowance does not conform to design) it is a simple matter, especially in three plane piping, to loosen the appropriate van stone flanges and to swing the piping around these as axes so as to make the necessary corrections.

The difficulty of erecting a welded piping system as accurately as a flanged system thus may well be imagined. The gaging surfaces are simply not as good, and yet it is important that the high temperature welded system be installed to a greater degree of precision in order that the conditions mentioned above may be met.

The basic principle to be used in the erection of high temperature welded piping systems is rather simple, although the detailed procedure may involve considerable work. The elementary principle involved is this—that the piping be made its own overall gage to erection accuracy. This can best be done by erecting the system as an independent unit between anchors or equipment; that is, by leaving both ends of the system unwelded.

Make System Its Own Overall "Gage"

A detailed discussion of the method to do this follows:

Erection may start at an anchor or piece of equipment; however, the initial joint is left unwelded. The joint is entered onto its backing ring, squared up properly, clamped, and braced securely in place. The remainder of the piping is then erected and welded with reference to the required lines and grades which have been establishd on columns and other structural steel.

Care must be taken to ascertain that each section bears the proper relationship to the previously erected portions. This may be accomplished successfully by the use of fairly long straight edges and levels. The levels should be not less than 3 ft long; straight edges 5 ft or more long are preferable. Where scale or local projections interfere, accurate shims (or vee blocks, preferably) are used to establish outside surfaces on the pipe. The levels used should be sufficiently accurate so as to be dependable, since they control the relationship between the elements.

The correct pitch can be maintained by levelling up between the ends of the long straight edge and measuring. It is preferable to have shims made to the thickness required with respect to the length of the straight edges. For example, a 5 ft straight edge and a pitch of 1 in. in 20 ft would require a shim ¼ in. thick. Feelers may be used, but under the circumstances and in the locations where piping normally runs it is difficult to have confidence in their setting and reading.

Horizontal alignment of each new section of pipe should be carefully checked with that of the previously erected portion. This may be accomplished by using long-eared pipe clamps. These should be bolted securely to extreme ends of each tangent section and after the ears have been properly leveled, a line stretched from a point on each clamp equally distant from the center line of pipe. This method of gaging may also be used as a check on vertical alignment. It is recommended that each joint be substantially tackwelded after alignment and then rechecked so that any tendency of the tackwelding to disturb the setting may be immediately corrected.

Use Permanent Hangers for Erection

During the aforementioned procedure, the piping may be erected with either temporary or permanent hangers and bracing. The use of permanent hangers for erection purposes will save considerable time and money, and is therefore to be preferred. However, when employing the latter scheme (especially when constant load hangers are used) it will be necessary to absorb the upthrust with struts, or use less than the full quota of hangers called for on the design drawings, since at this time the covering has not been applied. The use of struts is desirable because they maintain the sections already erected in a relatively fixed position. Temporary struts and bracing should not be welded to the pipe indiscriminately; indeed, it is preferable that the welding of these be prohibited entirely. Most authorities believe that at such points where temporary welds (not stress relieved) are removed by chipping hammers, conditions are conducive to the initiation of graphitization. Accordingly, it is suggested that an adequate supply of erection clamps be made available.

When all but the initial and final joints have been made up, fully welded and stress relieved, the line may be covered. All the joints should be left free of insulation until hydrostatic tests have been completed. The joints should have their insulation wired into place, plus a weight equal to the amount of cement estimated to be necessary.

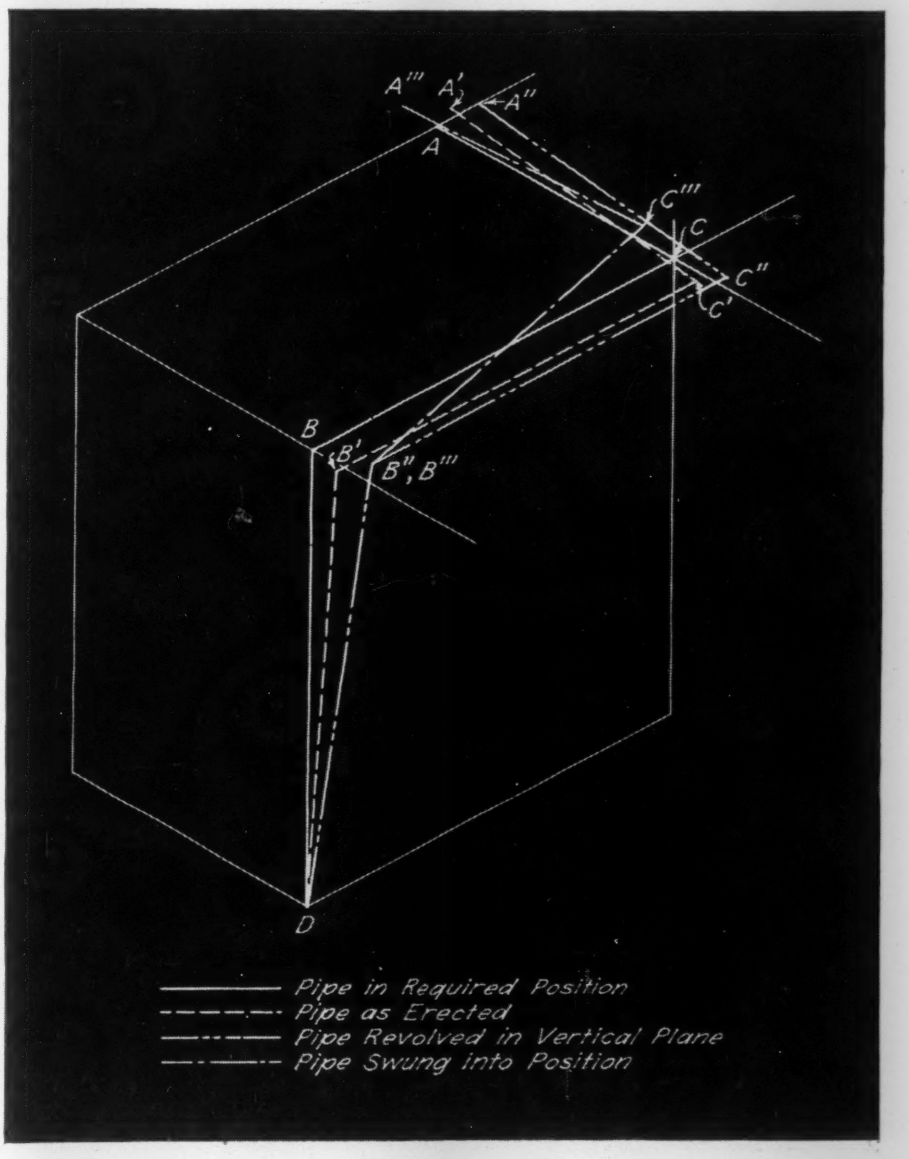
The entire system between anchors or equipment should now be freed of all bracing, temporary hangers, etc. The permanent hangers should be adjusted to properly float the system—that is, the line should be in the designed position with the designed pitch and gaps present. Any general sag or hump in the system may be corrected by adjustment of the hangers. However, any sharp local sag or hump would be an indication of incorrect erection. If such a condition is found at a weld, it indicates a joint which warped during stress relieving. If the system checks as to the overall requirements of pitch, end gaps, etc., the discrepancies mentioned above are serious only if they might pocket condensate.

In the latter case it may be necessary to use a stress relief ring to heat the portions kinked, and straighten them. When this is done, particular care must be taken that the section under consideration be given the identical heat treatment specified for the bends and other portions of the system. Especially is it important that the pipe not be worked at a temperature lower than that specified for the other bending operations, since most authorities feel that cold working increases the likelihood to graphitize.

How to Correct for Discrepancies

Although the described procedure should bring the line into the correct relationship for closure, there may be cases where it will not. These may be due to a number of factors, the more common of which are discrepancies in dimensions between anchors and equipment, the differential settlement of the structure, or variation of total pipe length due to fabrication tolerances.

Fig. 2—Pipe line in three planes. An error in vertical or horizontal alignment can be corrected by pivoting about point *D* in either or both planes



Such variables might cause difficulties in either plan or elevation. Suggested methods of correction for two typical runs will be discussed.

In Fig. 1, which shows a line in the horizontal or the vertical plane, it can be seen that any reasonable error perpendicular to the plane of the paper can be corrected by rotation about axis *AC* or *BC*. Should any error result in the piping coming to *A′* instead of *A*, the system may be corrected by swinging about point *B*, providing this does not cause interference with the structure or equipment.

As indicated in Fig. 2, which shows a line in three planes, an error in vertical or horizontal alignment can be corrected by pivoting about point *D* in either or both planes. A further correction in the horizontal plane may be made in a manner similar to that described with reference to Fig. 1.

In each of the cases of horizontal misalignment, only one position of *A′* has been shown. The reader will undoubtedly visualize the methods required to make other corrections.

It must be recognized that the methods suggested may introduce minor inaccuracies in directions at right angles or perpendicular to those being corrected. The magnitude of these errors is dependent on the relative lengths of the members in the assembly. Perfect closure may involve cutting or grinding the pipe and refitting the backing rings, or heating and bending the pipe. However, the procedure discussed should minimize the amount of bending. This is particularly important in the case of heavy walled alloy pipe. The importance of the proper heat treatment of the pipe during the bending operation has been previously noted.

It is recommended that when corrective measures such as mentioned above are utilized that a full report be made to the design section so that a record may be entered onto the drawings. This obviates any future questions as to the discrepancy between design and installation. Indeed, it is preferable that the field corrections be made only with the knowledge of the design group.

With the system now in its proper position and having the designed cold spring, it is ready for the closing of both free ends. These welds may be made in the usual manner. There is, however, an additional precaution to be observed while the final joint is being welded and stress relieved. The piping must be held so as to prevent the cold spring forces and moments from thinning out the joint while it is in the plastic state.

Block Hangers for Testing

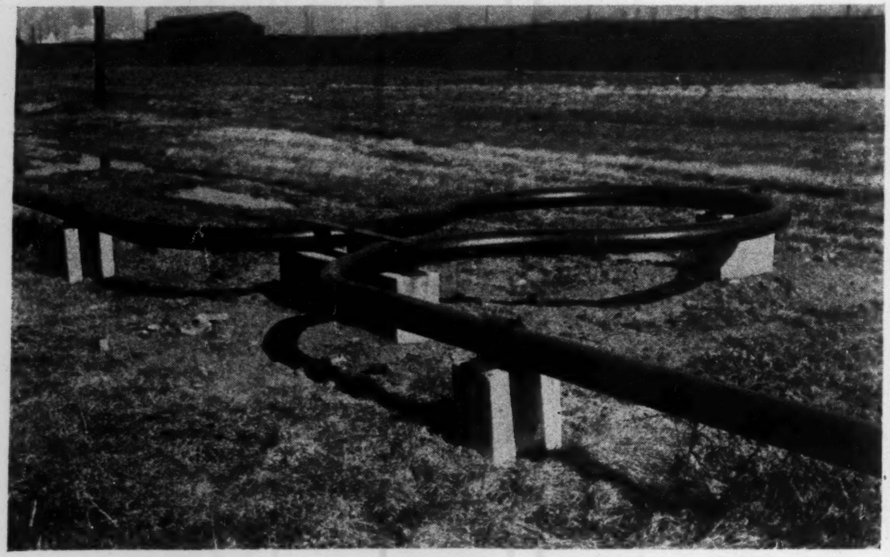
One other factor may be noted, although this is not essentially an erection problem. During the hydrostatic test of a system, the weight of water is imposed on the hangers, many of which are of the spring or constant load type. It is therefore important that these hangers be blocked securely before the test to prevent excessive bending stresses being set up in the pipe. The blocking must, of course, be removed after testing is complete.

Modernizes Compressed Air Piping

THE CHESAPEAKE & Ohio Railway Co. recently completed the rearrangement of the compressed air piping system in its Parsons yard at Columbus, Ohio. With the new system, most of the piping is above ground to allow more freedom of pipe movement during expansion and contraction. Moreover, the lines are readily accessible for any future changes that may have to be made.

Considerable amounts of compressed air are needed throughout the big yard for air operated tools, pumping up train reservoirs, and other uses.

Two sizes of expansion loops, one having a 50 in. radius and the other a 40 in. radius with double offsets, are used



The compressed air main line extends from the compressors in the machine shop the entire length of the yard, more than a mile. The main is fabricated of 3350 ft of 6 in. diameter wrought iron pipe resting on concrete piers about 18 in. above ground, and 2300 ft of 3 in. wrought iron pipe supported in the same manner. Metal brackets hold the pipe in place. The piers are spaced at 20 ft intervals for the 6 in. line and 18 ft for the 3 in.

Standard weight pipe was specified for the above-ground work, while extra-heavy pipe was installed underground.

Two sizes of expansion loops—one having a 50 in. radius and one a 40 in. radius with double offset bends—are installed at various locations in the main line. Drip pockets with manually operated valves are provided at low points in the system.

42 Air Conditioning Zones at New IBM Plant Addition

J. T. BROWNE, plant engineering office, International Business Machines Corp., Endicott, N. Y., describes the new air conditioned manufacturing building at the Poughkeepsie plant, which is divided into 42 zones, the unit for each of which is complete with fan, coils, and controls. Perimeter heating, using forced hot water in finned pipe, prevents discomfort due to cold walls. . . . Experience has indicated that industrial comfort air conditioning differs from comfort systems in commercial buildings, due to machine loads, effect of industrial exhaust, and because workers are assigned to definite locations at which they remain for long periods

International Business Machines Corp. has recently completed a new air conditioned addition to its Poughkeepsie, N. Y., plant. This new manufacturing building, which has approximate outside dimensions of 504 ft by 143 ft, is three stories high. Constructed of steel and concrete, the building has walls of brick and large areas of glass block. A 2 ft section of double clear glass at the sight level has been provided to eliminate the "shut-in" feeling which some people experience in buildings which have walls constructed entirely of opaque material. Since the clear glass sections can be opened, a means of ventilation is thus provided in case of failure of the mechanical system.

The ground floor will be used for the storage of both raw material and finished parts. In addition, a certain area has been selected on this floor for the plant cafeteria. The first floor will be occupied by the machining divisions of the company. On the second floor will be the assembly section.

On the first and second floors, the toilet and locker room area occupies a section 17 ft wide running the full length of the building, and broken in several places by cross aisles connecting one side of the building with the other. The second floor has an acoustical ceiling 14 ft above floor level. The ceiling is unobstructed except for the flush type air outlets, sprinkler heads, and the flush fluorescent lighting fixtures. Above this ceiling is space for air handling units, ductwork, and other necessary industrial equipment.

Each Zone Has Conditioning Unit

The entire building is divided into 42 zones, each of which has its own air conditioning unit complete with fan, coils, and controls. Each unit is so valved to the main lines that it can be completely removed from service for repairs without interfering with the operation of any other unit. Thus, conditions in each section can be controlled independently of those in any other section. This is an advantage in a manufacturing building where it often becomes necessary to change loads and air quantities due to addition or rearrangement of equipment required by changing production schedules.

The units vary in size from 1000 cfm to 11,000 cfm. The smallest supplies the first aid department, which also has its own exhaust system, making it entirely separate from the rest of the plant. The ground floor units are mounted on the ceiling and blow the air directly into the conditioned space. Each unit is directly connected to the outside air by means of an opening through the wall. The amount of outdoor air can be varied to suit existing conditions. The ground floor units ventilate and heat the areas which are served by them.

There is a 2 ft section of double clear glass to eliminate "that shut-in feeling"

Each unit has its own viscous, cleanable filters. In all other sections of the building, heating is by a separate system; however, ventilation air for all floors is conditioned by coils in the units.

The units for the first floor are in a section above the toilet and locker room area and are of the vertical type. This section is completely filled with equipment and service lines as it contains (in addition to the units) filter banks, ductwork, steam lines, plumbing lines, and electric lines. Outdoor air is supplied to these units by means of six insulated ducts, each 6 ft by 2 ft in cross section, which run from the ground floor wall, across the ceiling, and up into the unit corridor. The vertical sections of this ductwork contain louvered openings for returning the recirculated air to the units.

Air leaving the units goes out through a system of ductwork on the first floor ceiling to a series of circular outlets which evenly diffuse the air through the conditioned zone, and equalize the temperature throughout the area.

The second floor units are in an area above the second floor ceiling. Air discharging from the unit is conveyed through ductwork entirely above the ceiling, and is distributed to flush circular ceiling outlets. Each unit has its own individual outdoor air duct running to the roof. The recirculated air returns to the units through ceiling grilles into the space above the ceiling, which acts as a plenum chamber. From there the air is either drawn in through the louvered opening in the outdoor air duct, or is exhausted from the building through the fans in the roof. Filters for the second floor units are located in the individual units.

The total quantity of air handled by all the units is approximately 420,000 cfm. All units are of the combination type and the quantity of outdoor air being handled by a unit can be changed in accordance with existing conditions.

Forced Hot Water Perimeter Heating

Heating of the first and second floors of the new building is done by means of a forced circulation hot water system. The heat exchanger is of the convector type in the form of a finned pipe which runs below the windows around all the exposed sides of the building.

Ductwork for the second floor is entirely above the ceiling and the air is distributed to flush type circular ceiling outlets

This means that the heating system for these areas is independent of the ventilating or cooling system. Heating and cooling are very often accomplished by the same equipment; in fact, that might be said to be the usual arrangement. However, our experience has indicated that people working near outside walls and windows are uncomfortable in cold weather even though the air temperature set up by the ventilating system may be at a satisfactory level. This discomfort is due, of course, to radiation of heat from the body to the cold surface. It can be prevented only by blanketing the surface with heat by a system of perimeter heating having its own independent controls.

Each floor is divided into four zones, each of which has its individual heating system, complete with controls, water heater, and pump. This not only makes the system more flexible, but also reduces the temperature variation found in single systems. Each zone is separated into sections having return water thermometers, and lock shield supply valves for balancing. The entire system is designed on the basis of a 10 deg temperature differential between the supply and the return of the water. The space above the second floor ceiling is kept warm by the return air on the way back to the units. Although the temperature in this area will be several degrees below the normal floor temperature during the heating season, it will be warm enough to suit the requirements of the section.

The locker rooms are ventilated by air taken directly from the units, and have 10 air changes per hour. Each room has individual supply ducts and circular ceiling type air diffusers. Since the air will probably be too cold because of the small load compared to the manufacturing area, each locker room has a separate thermostat and booster heater to make the temperature comfortable to the occupants of the area. An exhaust system, taking air from the manufacturing area, provides 15 air changes per hour for each toilet room located on the first and second floors in the same section with the locker rooms.

Inside Humidity Drops With Outside Temperature

All thermostats and humidistats are of the gradual acting type. All unit humidistats are automatically reset by a master device so that as the outside temperature drops from 30 to minus 10 F the inside humidity will decrease from 40 to 20 percent. This is done to prevent condensation on the walls during cold weather.

The normal position of the unit outdoor air dampers is such that approximately 25 percent of the total air handled is outdoor air. In some cases, the value is larger due to high exhaust requirements in a particular area. However, in the spring and fall—when the outside temperature is right for cooling—the ratio of the outdoor air to the recirculated air is controlled by the individual space thermostats. Under these conditions, it is possible to build up a substantial static pressure within the area as the quantity of outdoor air supplied for cooling purposes may exceed the quantity removed by the various exhaust systems by a ratio of three or four to one. In order to prevent this pressure buildup, there has been installed a series of exhaust fans controlled by a pressure sensitive device in the working area to keep the pressure at a predetermined setting. These fans are started in sequence and in steps of two fans at a time. They have capacity to handle the entire outdoor air supply, less the amount which is removed by the regular exhaust systems.

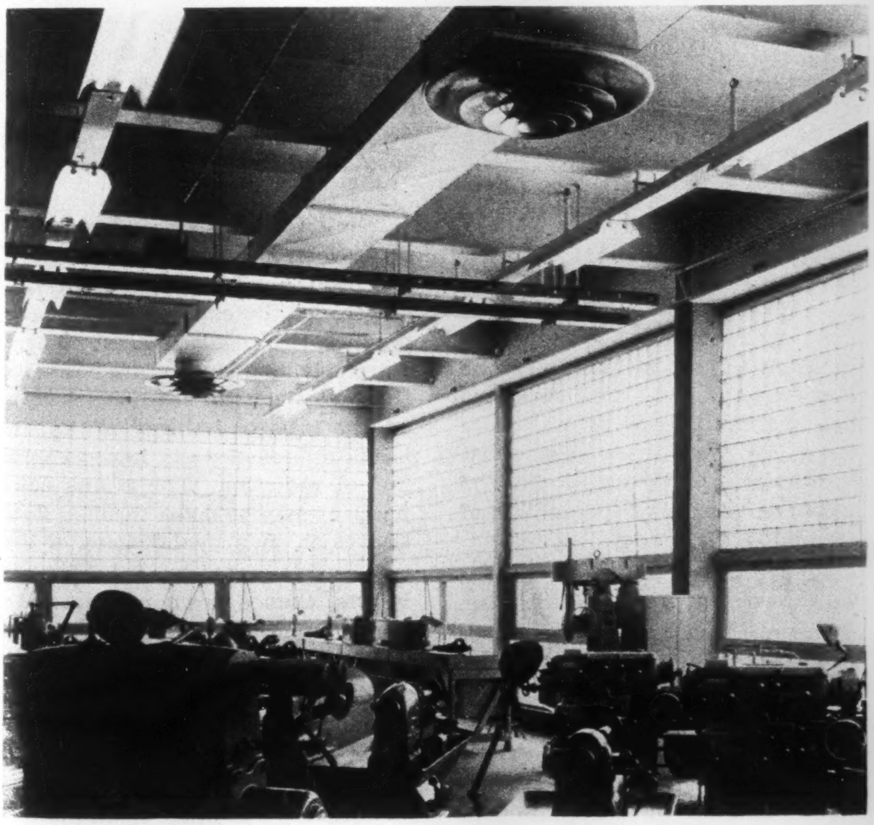
The fans serving the first floor are located at the tops of the various stair towers. Each opening into the tower is protected by a grille and automatic louvers. The fans serving the second floor are at the roof level, and in this case air can reach them through the regular return air grilles in the ceiling of the second floor.

Each unit is provided with a low limit thermostat which will shut down the fan if, for any reason, the temperature of the discharged air falls below 50 deg.

Each perimeter heating system thermostat, located in the working area near the outer wall, controls the unit hot water heater steam valve so that the temperature of the circulating water is always sufficient to overcome the heat losses. A limit device prevents the temperature of the water from exceeding 200 deg.

Each stair tower is provided with flush type convectors located at the stair landings, and the temperature of each tower is controlled by a modulating type thermostat.

Air leaving the units serving the first floor goes through a system of ductwork on the first floor ceiling to a series of circular outlets which diffuse it evenly



Heating steam for this building comes from a boiler room about a third of a mile away on the Hudson river. The supply line, carrying steam at 125 psi pressure, runs underground for almost the entire distance. At the new building, this pressure is reduced to 15 psi and is used at this pressure in all heating equipment. Condensate is returned to the boiler room over the same route used by the supply line.

Industrial, Comfort Conditioning Differ

The Endicott plant of IBM has an installation totalling nearly 2300 tons of refrigeration which supplies chilled water to air conditioning apparatus serving an area of approximately 600,000 sq ft of manufacturing, laboratory, and office space. It was in 1934 that a 500 ton system was placed in operation to condition an industrial area covering approximately 80,000 sq ft.

The corporation's experience has indicated that an industrial comfort air conditioning system differs in three ways from a comfort system installed in a theater, hotel, restaurant, or similar building. In industrial plants, the machine load is one of the main elements of the cooling load. Varying over a wide range, it may be as high as half of the total load. Since little or no data have been published in connection with this load, it is necessary to determine its value by experimental means.

In industrial work, the amount of outdoor air employed in a system is usually determined by the amount of the exhaust. Industrial exhaust is also a variable quantity which continually changes due to addition or removal of machinery and relocating of departments. In theaters, hotels, restaurants, and similar places, the amount of outdoor air is usually known in advance and remains practically constant.

In industrial buildings, workers are assigned to definite locations and remain for a long period of time in the same place. Because of this fact, more accurate adjustment of air motion and temperature is required to prevent complaints.

The building was designed and construction was supervised by the IBM plant engineering departments at Endicott and Poughkeepsie.

[Photos by Joseph W. Molitor and courtesy Anemostat Corp. of America.]

E. W. WINCHESTER, of the Kuljian Corp., engineers and constructors, Philadelphia, has had quite a bit of direct experience with baseboard radiation—including its use in an old home he modernized for himself. Little has been published of a practical nature on use of this type of radiation in larger buildings, and he has written this article to help supply the need for data on such applications

Pointers on Using Cast Iron Baseboards in Big Buildings

BASEBOARD radiation has proved successful for use in private homes but little has been published on its applications to apartments, offices, and large buildings. Since space is an important factor in the planning of any building, and heating is a "necessary evil," equipment that provides heat with the least sacrifice of space is always of interest.

Speaking generally, there are three types of baseboard radiation. One is designed for a larger proportion of radiation, and the unit presents a practically flat surface both back and front. The second combines radiation with convection, and this unit has fins on the back surface and long slotted holes through the unit near the top; it is raised off the floor approximately 1 in. so that the air may pass under the unit and be heated by the fins. Provision for supporting the unit is made by legs on the end sections and by one or more small brackets off the floor at intermediate points. The third type is the convector type.

The units range from 1½ to 2 in. in thickness and 7 to 9 in. in overall height. Units may simply be installed against the finished wall or recessed slightly. A sheet of building paper is generally placed behind the unit, brought up over the top, and sealed by a quarter round or other type of molding strip to prevent dust streaks on the wall.

Inlet and outlet connections are at the ends, and neat panels are available for concealing the piping. The units may be extended around corners with piping which is concealed by a special corner panel.

Cast iron units are generally made in 2 ft sections which are factory assembled in lengths up to 6 ft; they are rated at so many Btu per linear foot according to the temperature of the heating medium. Thus, the required length of each unit is easily calculated.

Let us consider first the small or medium sized apartment building of the so-called "duplex" type. Here the construction closely resembles that of an individual home. The outside walls are generally of the load bearing type and present an unbroken surface except, of course, at partitions. Generally, at least one wall of each room is exposed. Normally, the length of the exposed wall only will more than contain the required length of radiation. However, it is desirable that the dimensions of the room and the length of the radiation unit be worked out together so that no matching of baseboard is necessary.

The length of the unit is limited to approximately 70 ft for forced hot water and 15 ft for steam, but these upper limits should not affect most installations. Where conditions warrant it the unit may be extended through partition walls so that one unit heats two or more rooms. Such an installation must be made prior to the erection of the partitions because of the method of assembling the units.

Many of these smaller apartments use forced hot water for heating. The supply and return headers for each apartment may be located between joists or suspended ceilings and connected to the house mains at conveniently located pipe chases. No difficulties have been experienced either in the installation or operation of this branch header system but it is recommended that a good test be made on the system before the pipes are closed in. Such an installation eliminates exposed risers.

Hospitals, office buildings, schools, government buildings, hotels, and large apartment houses may be classed as a group as far as building construction is concerned except that the interiors of hotels and apartment houses require treatment for their use as living quarters. Here there are generally exterior columns, deep beams, and concrete slab floor construction. The special treatment given to the interiors of hotels and apartments, such as arrangement of partition walls on column centers and the use of suspended ceilings, eases the problem with any type of heating system.

For most floors the heating requirements are reduced considerably; therefore, a unit the length (or even much shorter than the length) of the exposed wall should produce the required heat. Where extremely long lengths are required, the fact that the entrance door is off the interior hallway allows the use of unbroken walls, hence a solid line of radiation. The piping connections may be made through floor sleeves or, by a modification of the end panels, extended into the pilasters, thence down or up to the headers above the false ceiling.

Since steam or vapor is generally used for the larger buildings, care should be taken to select a trap which will fit into the end panel. Because of the broken wall lengths in bathrooms or other small interior rooms, it may be necessary to use portions of two of the walls for the radiation in these spaces.

For these small spaces it is suggested that the 20 in. x 5 in. combination convector-radiator might well be used. These compact little radiators may be placed in a recess no more than an inch longer than the length of the radiator (the piping connections are made from the inside instead of the outside), and their heat producing capacity is quite high.

Exterior hallways offer no great problem unless the wall is broken by pilasters. Where this occurs, the units between pilasters may be joined by piping through the pilaster and around the column.

The remaining types of large buildings do not generally include the use of suspended ceilings or partitions on column centers. However, since the risers are often within the pilasters, piping connections are still available and can be concealed. It is suggested that, since the floor space and consequently the volume of a commercial building is quite large in proportion to the exposed wall area, the baseboard radiation be used only on exposed walls. If used along interior walls or partitions, filing cabinets or other equipment may nullify the heating effect.

The arrangement of baseboard radiation to suit the dimensions of a room is almost but not quite as easy as sawing off a board to suit. A few simple facts, which with use become second nature, must be remembered. The cast units are furnished in multiples of 1 ft. To this length must be added the length of the panels which conceal the piping connections. The end panels may be omitted for installations where the appearance is not of first importance but even here the piping connections require about 60 percent or more of the length occupied by the panels.

Where but a few inches remain to close out a wall, it is suggested that special long end panels be made to order. The required lengths of both the purely radiant and the convector types should be calculated and studies of both types should be made to see which will fit to better advantage.

The details of installation must be carefully worked out. The inlet and outlet connections are only an inch from the back of the radiator which is also the face of the wall or recessed surface. With wall bearing construction, the direction of the floor joists should be noted and if they are parallel to the radiator, clearance must be allowed for the pipes. For steel framework construction, the fireproofing for the spandrel beams should be investigated. In any event it is well to provide sleeves in the concrete slab since the connections are so close to the wall that it will be difficult either to drill or core through the slab.

With the recessed radiator, the recess should be ¼ in. higher than the radiator and the length should allow for the ⅛ in. per 10 ft average expansion in the radiator. If quarter round molding is to be used for the top trim, the ground strip should not be over ⅜ in. thick and should project to the finished face of the plastered wall—otherwise crack lines in the plaster may show up.

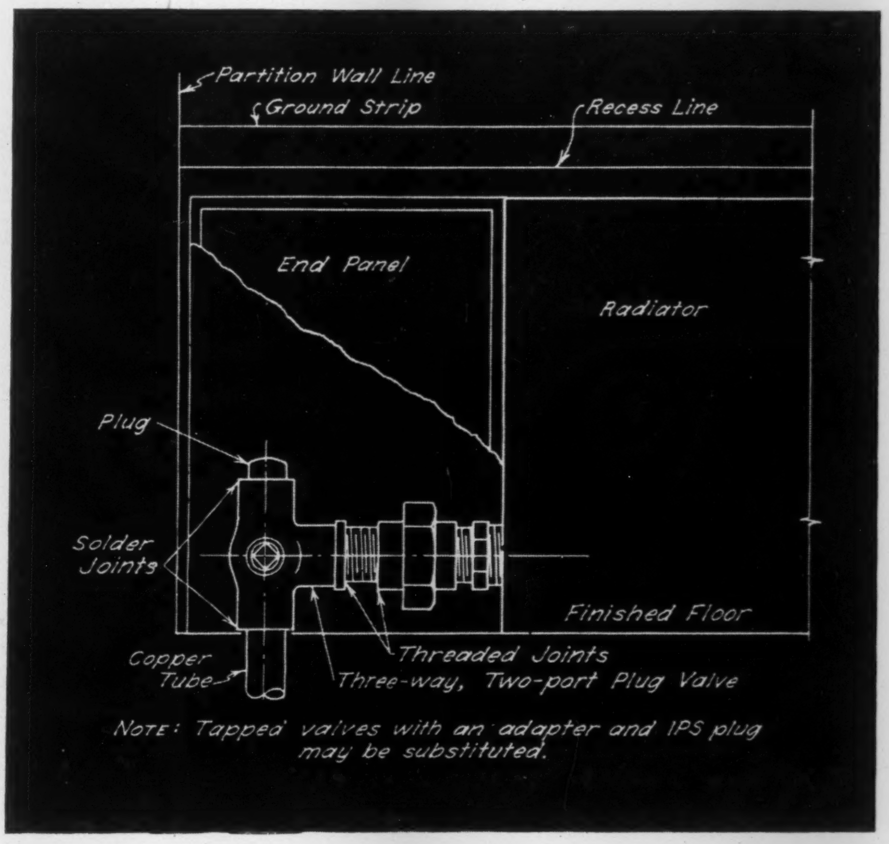
The molding should be attached to the ground strip with screws, not nails. A good method of detailing the recess would be to cut off the furring strips above the recess and attach to the bottom of the strips a strip of asbestos cement board. The inside of the exterior wall should be plastered with an insulating mortar up to the face of the recess. It is also desirable to fill in with this mortar between the furring strips for 6 in. above the ground strip. Where the projected wall is too thin to allow the use of an insulating mortar back of the radiator, it is suggested that an aluminum foil and paper sandwich be substituted for the building paper dust seal.

Specifications should call for the use of full sized templates and the recesses should be tested for size before any plastering is done. If the floor is built up over a concrete slab, the template should allow for this additional height.

The use of end panels which conceal the piping connections introduces a new idea (or restores an old one). Radiator valves were developed for their appearance and ease of operation. Since—with baseboard radiation—they are behind panels, the only thing required of them is their ability to shut off the flow.

An ideal valve for this service is the plug type. For hot water, a valve on each end is recommended; the valve on the outlet end may be used to balance the heat require-

Arrangement of piping for vertical branches with baseboard radiation



NOTE: Tapped valves with an adapter and IPS plug may be substituted.

ments while the valve on the inlet end may be used to shut off the flow completely. For steam or vapor the outlet requires the usual thermostatic trap. Where pipes are extended down through the floor a three way-two port plug valve with one end plugged would be used. This avoids the necessity for left and right hand "angle" plug valves. Where the connections come from risers within pilasters the ordinary two way plug valve and, for steam, a straight through thermostatic trap will serve the purpose. This type of valve should give tight closing service. The absence of a valve handwheel will eliminate tampering and even the partial throttling of the plug valve will not unduly affect its ability to shut tight.

The plug valve and a regular union made up with close or short nipples will fit inside the end panels where ½ in. connections are used. For ¾ in. connections, the maximum available, it may be necessary to use special length end panels or secure a plug valve with a union fitting on the radiator end.

The installation of baseboard radiation, when properly understood, can be very simple. The shipping length of 6 ft, plus the smooth face or faces, makes it easy to handle. If required, a fitter can carry from the stockpile, assemble, and install a unit at least 20 ft long with no help and little exertion.

The job assembly eliminates the need for marking and searching for the required size of radiator. If a particular location requires, say, 17 linear feet of radiation, the fitter merely picks out a standard 6 ft end section, a standard 6 ft middle section, and the made up 5 ft end section. Even where deliveries are at variation with requirements, investment in a small stock of various end sections will enable the contractor to correct the difficulties without too much if any loss.

The sections are joined together top and bottom with push nipples. The backs of the sections are recessed to receive a special clamp which is used to draw the sections together. After full metal to metal contact is made, the clamp is removed and the sections are held together by a bolt.

With some types of radiators the clamp is below the center of the two push nipples. This causes the bottom part of the contact surfaces to close while there is about a ⅛ in. gap at the top. Further tightening of the clamp may fracture the casting. This may be overcome by tightening up till the bottom is closed.

This operation is done while the radiator is lying face down. Then the clamp is backed off slightly and the radiator is rolled over to its normal position. Its own weight or gentle pressure will force the top shut (and reopen the gap at the bottom). The radiator is then rolled back down on its face and the clamp tightened till the gap at the bottom closes. This operation may have to be repeated several times before full contact is secured, but the entire performance takes very little time and that time will more than pay for the time and money lost waiting for a new section to replace the cracked one.

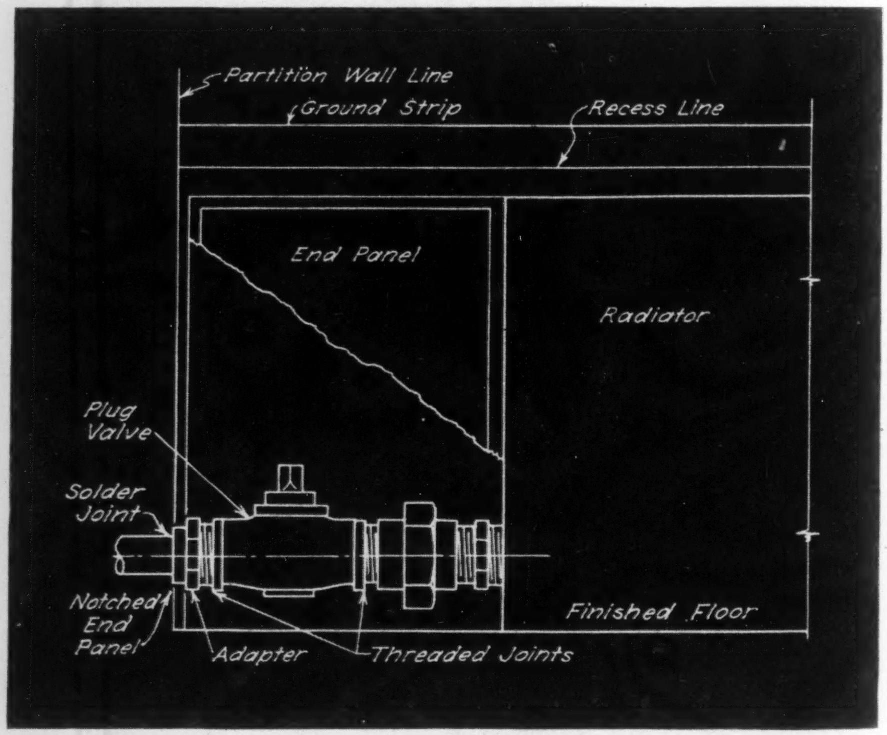
It has been found that the longer the two sections to be joined, the easier and quicker it is to make up the joint. The increased moment produced by the centering of the field joint makes the closing of the top gap almost automatic and the one backing off operation usually ends the assembly. The sections are easily separated by removing the bolt and applying gentle pressure to the top of the unit.

The only increased difficulty involved in piping up baseboard radiation as compared with other types is the fact that the location of the pipe taps spots the end of the radiator valve at or below floor level. Two methods of making this job are offered. One is to attach the valve to a length of tubing on the bench and push the tubing through to the header. The other is to make the connection at the header, allow enough slack in the tubing to place the valve well above the floor, make the joint, then work the valve down to its proper position.

Although it has been mentioned before, too much emphasis cannot be made on checking recess clearance and wall to wall fit. Whether or not the job has been inspected and controlled, the contractor can save himself many a day's pay if he spends a few hours time checking these clearances before the plaster work is started. The use of an adjustable dowelled wood template is a quick way to prove out the recess.

Baseboard radiation will take the same painted finish as the adjacent wood baseboard and match it very closely. It is well to go over each field joint and remove all traces of the pipe joint compound before painting. Often, the ordinary grey foundry finish will prove to be a suitable color for the initial installation.

Piping arrangement for horizontal branches from mains at building columns



MULTIROOM AIR CONDITIONING

The Two-Circuit Unit

C. L. RINGQUIST and A. C. MENKE, manager, air conditioning department, and air conditioning engineer, respectively, The Trane Co., LaCrosse, Wis., classify the types of air conditioning systems for meeting the requirements of multiroom, multistory buildings (hospitals, hotels, office buildings, etc.). Successful comfort cooling depends upon proper design and controls to operate at minimum loads. Technical details of the operating cycles of the new two-circuit unit conditioner method for meeting the requirements of such buildings are explained

THE EVOLUTION of air conditioning for multiroom, multistory buildings has resulted in three basic systems for achieving control of the quantity and quality of conditioned air: (1) the central system, whose ducts carry recirculated air and ventilation air from a central equipment room to the conditioned space; (2) the modified central system (or modified unit system), which conditions ventilation air at a central point and transports it by small ducts to the conditioned space, and which conditions recirculated air at individual units located in the conditioned space; and (3) the unit system, which conditions both ventilation air and recirculated air within a room unit. While these basic systems have many prototypes, all air conditioning systems for multiroom, multistory structures—such as hotels, hospitals, apartment houses, or commercial buildings—can be placed in one of the above classifications.

Each of these systems has advantages and disadvantages which, when analyzed carefully, indicate the logical selection for a particular application. Often the systems will be combined in a building so that various areas will be conditioned by the system best adapted to fulfill the air conditioning requirements of the particular space. For the multiple room areas of large buildings—the guest floors of hotels, the patient rooms of hospitals, or the small office spaces of commercial structures—the unit system of air conditioning is particularly applicable.

The unit system utilizes a central refrigeration and heating installation to temper the water supplied to the building zones, but all air processing—cooling or heating, dehumidifying, and filtering—is accomplished within the space to be conditioned. According to whether heating or cooling is required, water (or other heat carrying medium) of the correct temperature is circulated through a conventional piping circuit to the heat transfer surfaces of the room units. No supply air ducts from a central equipment room to the conditioned spaces are necessary. There are numerous advantages to such an air conditioning installation; however, the purpose here is to discuss an important limitation of conventional unit systems and how an interesting new development presents one solution to the problem.

A conventional unit air conditioner has one air flow circuit to condition both the ventilation air and the recirculated room air. Outdoor air and return air are mixed in the correct proportion before passing through the single coil of the unit (see Fig. 1). This coil accomplishes both sensible and latent cooling of the air mixture, and the mixture then passes through the fan and into the room.

A drawback to the performance of this conditioner is its inability to meet variable load conditions, especially where control of humidity is important. While the maximum operating load establishes the size of the room unit, the successful operation for comfort cooling depends upon the proper design and controls to operate at minimum loads.

A typical control system changes the room supply to meet partial loads by either throttling the flow of water or modulating the temperature of water supplied to the coils of the room unit. These two actions, employed separately or in combination, are usually initiated by temperature-responsive control instruments. Thus, control operation is based upon doing the proper amount of sensible cooling. Since only one coil is involved, it is impossible to control the sensible cooling without affecting the latent cooling accomplished.

If the dry bulb temperature of the air supplied to a room is increased to meet a low sensible cooling load, the dew point temperature would necessarily be higher. It is probable that the room humidity would be increased when the problem is actually one of dehumidification.

This inherent inflexibility may be illustrated by plotting the area of possible supply states on a psychrometric chart. Referring to Fig. 2, room air, represented by point *A*, and outside air, point *C*, are mixed before passing through the coil. The condition of the air as it flows through the coil is indicated by the curve *BED*. The leaving state, point *D*, is the supply to the room for the maximum cooling load.

To meet loads other than maximum, the control system throttles the water flow or modulates the water temperature. The range of possible supply states in the cooling and dehumidifying quadrant of the psychrometric chart due to these control actions is represented by the area *DEF*. A point on the psychrometric chart representing the correct supply state must lie in the area *DEF* and along the SH/TH (sensible heat/total heat) ratio line which exists if the desired room conditions are to be maintained. The area *DEF* is thus a visual representation of the inflexibility of one-circuit unit air conditioners.

As the sensible load decreases, the control system will increase the dry bulb temperature of the supply air in order to hold the room temperature constant. When the sensible load has decreased to 70 or 80 percent of the design capacity, the supply air to the room will be above the room dew point. Humidification will occur even though dehumidification may be necessary to achieve comfort.

One-circuit conditioners thus are applicable where latent loads are low in comparison to the sensible loads and where absolute control of humidity is not important.

To provide better moisture control, a two-circuit unit air conditioner may be used. One of these

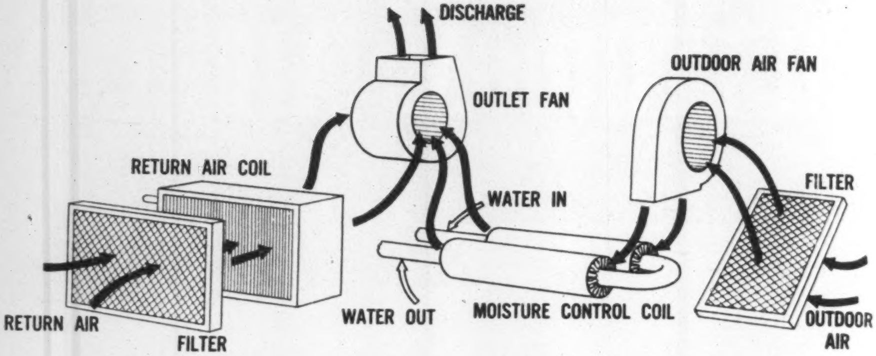
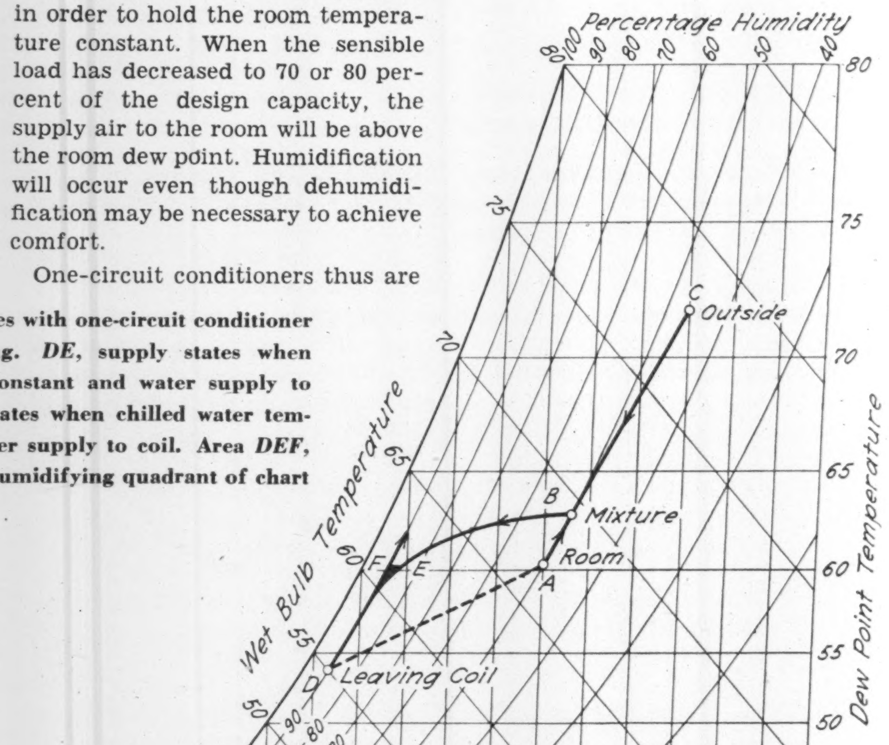


Fig. 3—This diagram shows air flow through a two-circuit conditioner

Fig. 2—Possible air supply states with one-circuit conditioner for cooling and dehumidifying. *DE*, supply states when chilled water temperature is constant and water supply to coil is throttled. *DF*, supply states when chilled water temperature is modulated, full water supply to coil. Area *DEF*, supply states in cooling and dehumidifying quadrant of chart



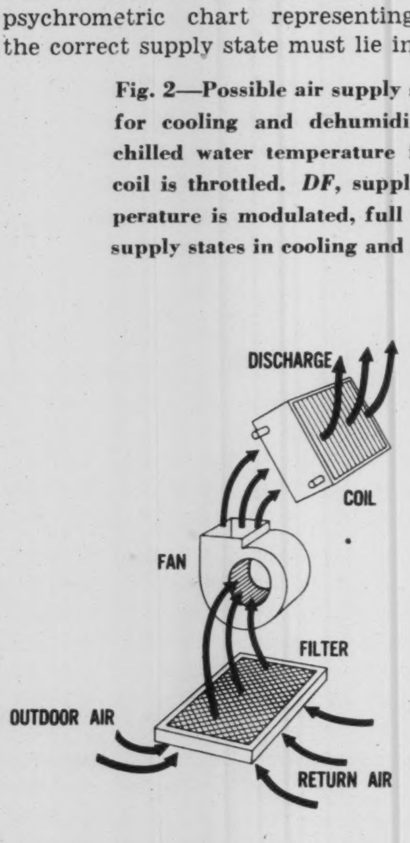


Fig. 1—Diagram showing air flow through a one-circuit air conditioner

circuits is the conventional coil-fan-filter arrangement used to condition the recirculated room air. The second circuit processes and controls the moisture content of the ventilation air.

Fig. 3 illustrates the arrangement of the apparatus of a two-circuit conditioner. The two air streams, return air and outdoor air, are conditioned separately before being mixed and discharged by the fan into the room. The moisture control coil reduces the dew point temperature of the ventilation air to a sufficiently low value to accomplish the latent cooling necessary. By reducing the dew point, the dry bulb temperature is decreased so that the moisture control coil also absorbs a portion of the room sensible load. The remainder of the room sensible cooling is accomplished by the return air coil.

Because the two air streams are processed separately in the two-circuit unit air conditioner, there is independent control of the dew point temperature and the dry bulb temperature of the supply air. Even though the sensible cooling load becomes very small, dehumidification is accomplished by the ventilation air passing through the moisture control coil.

The range of supply states for a two-circuit room conditioner is illustrated on the psychrometric chart of Fig. 4. Again the discussion will be restricted to the case where the SH/TH pickup line falls into the sensible cooling and dehumidifying quadrant of the psychrometric chart. Referring to Fig. 4, ventilation air, point *B*, enters the moisture control coil and, following the condition curve *BCF*, leaves at point *F*. Recirculated room air, point *A*, follows the condition curve *AD* and leaves at point *D*. The two air streams are mixed and discharged by the fan into the room. This mixture, point *E*, represents the supply to the room for the maximum cooling load. For loads less than maximum, a typical control arrangement will either modulate the temperature of the water or throttle the flow of the water supplied to the coils of the room units. The range of supply states due to both of these actions is represented by the area *EGHC*.

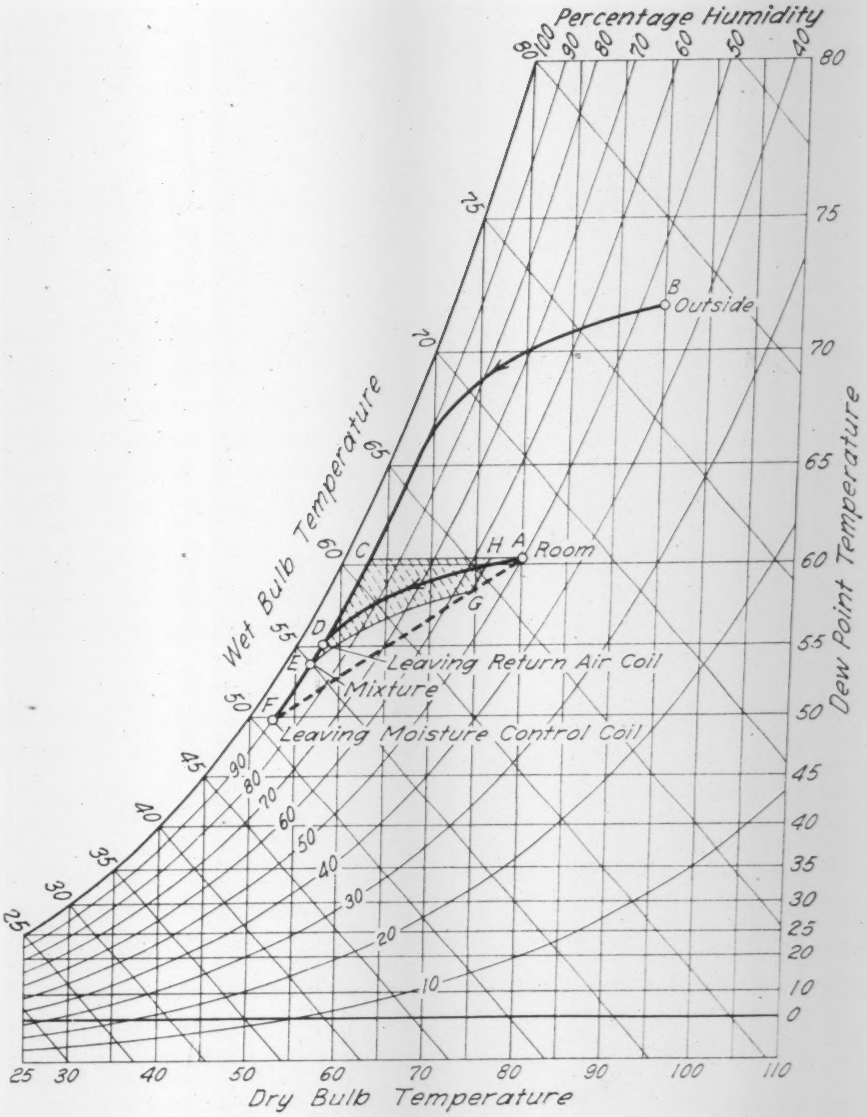


Fig. 4—Air supply states with two-circuit conditioner, cooling and dehumidifying. *EG*, supply states when chilled water temperature is constant and water supply to return air coil is throttled. *GH*, supply states when chilled water temperature is modulated, no water supply to return air coil. *EC*, supply states when chilled water temperature is modulated, full water supply to return air coil. Area *EGHC*, supply states in cooling and dehumidifying quadrant of chart when chilled water temperature is modulated and water supply to return air coil is throttled

Comparing this area to the area *DEF* of Fig. 2, the greater range of cooling loads which can be met is apparent. Because of separate conditioning of the ventilation and recirculated air streams, the room supply is readily adjustable to changing room conditions. Virtually all supply states required for comfort conditioning can be met.

As an added advantage, three cycles of control are possible with the two-circuit conditioner. The one-circuit air conditioner can provide either full cooling or full heating, whereas, the two-circuit conditioner with separate coils for conditioning two air streams can provide full heating, full cooling and, in addition, latent cooling but sensible heating. This third control cycle is accomplished by supplying chilled water to the moisture control coil for dehumidifying and warm water to the return air coil for reheating. This necessitates separate supply risers for the two coils.

Two-circuit unit air conditioners thus are seen to be applicable where separate control of temperature and humidity is important and where flexibility to meet minimum loads in order to maintain stated room conditions is necessary.

Present Chart to Simplify *Design of Radiant Heating*

J. K. FAIRBAIRN and R. P. GOEMANN (mechanical engineer, Chicago; and heating, ventilating, and air conditioning designer, John D. Dillon, consulting engineer, New York City, respectively) believe from their experience that most radiant heating systems are overdesigned. They have developed the chart published here in order to promote the ease and economy of radiant heating design, have found it valuable in their own work

For some time, it has seemed to us and to many of our associates that existing methods of radiant heating calculations left much to be desired from the viewpoints of economy and ease of design. The calculation method and nomograph presented here were developed from our experience with radiant heating installations designed on previously existing information.

We believe that existing methods of calculation result in heating systems which are overdesigned. In checking and trying to balance radiant heating systems, we have found repeatedly that temperature drops exceeded those calculated. An attempt to reach the calculated temperature drops by choking the flow always ended in failure, as the heat release did not come up to calculations when the velocity in the tube was reduced by choking. We never found any simple method of determining the velocity in the tube buried in plaster or concrete.

Correction Factors Being Used

The laboratory checks which have been made by various authorities have seemed to us to be of limited value, as thousands of radiant panels are installed in various spaces and observed results should be able to confirm theoretical calculations if the theory is correct.

Instead of confirming theoretical calculations, observed results have often been so far off that many of our associates in various sections of the country are using correction factors at the time of design. The two most common such factors are to reduce heat loss calculations 10 to 20 percent and to design at a top temperature of 150 F (which would calcinize plaster), knowing that the top temperature would never exceed 120 to 130 F.

The surface output used in our calculations is based on Nusselt's value for conduction and the Stefan-Boltzmann formula for radiation. The nomograph is based on a 70 F room air temperature and gives a simplified design method for floor, ceiling, and wall panels.

We trust that field results of designs based on this chart will be as satisfactory to other engineers as they have been to us.

Sample Problem Worked Out

For a sample problem to show the use of the chart, assume a ceiling panel, attic above, rough floor, 8 in. joist with 4 in. of rock wool insulation, metal lath and plaster, ⅜ in. type K copper tubing. The tubing is to be on 6 in. centers, with a minimum of ¼ in plaster cover.

The room is 12 ft by 16 ft, with a heat loss of 9000 Btu per hr. The entering water temperature is 140 F, with a 20 F drop.

The *U* coefficient has been a much debated question in radiant heating, and the authors are preparing another chart designed to eliminate paper work in determining *U*. The normal procedure in determining *U* has been to use mean area. It is our contention that the low depth of bury and the converging heat from adjacent pipes make accurate calculation impossible, and we have achieved a *U* which approximates observed results by substituting surface area for mean area.

Using this method, the *U* coefficient works out to be 0.46 Btu per F per ft of tube per hr for the heat down with a surface temperature of 107.5 F and 140 F water. The panel loss to the attic space is 0.03 Btu per F per ft per hr. The total *U* coefficient is therefore 0.49.

Using the standard friction loss charts for hot water heating, we get the carrying capacity of a ⅜ in. tube. In this example, we are using a 20 F water temperature drop and 9000 Btu per hr required panel output. We find from the friction loss information a water velocity of 2 fps and a friction loss of 0.05 ft per ft.

With standard high velocity circulators, the available head is 10 ft. With the tube length, valves, and fittings required, this head would be exceeded in this example, the result being insufficient heat output. Two panels will therefore have to be used to cut down the friction loss, each supplying 4500 Btu per hr.

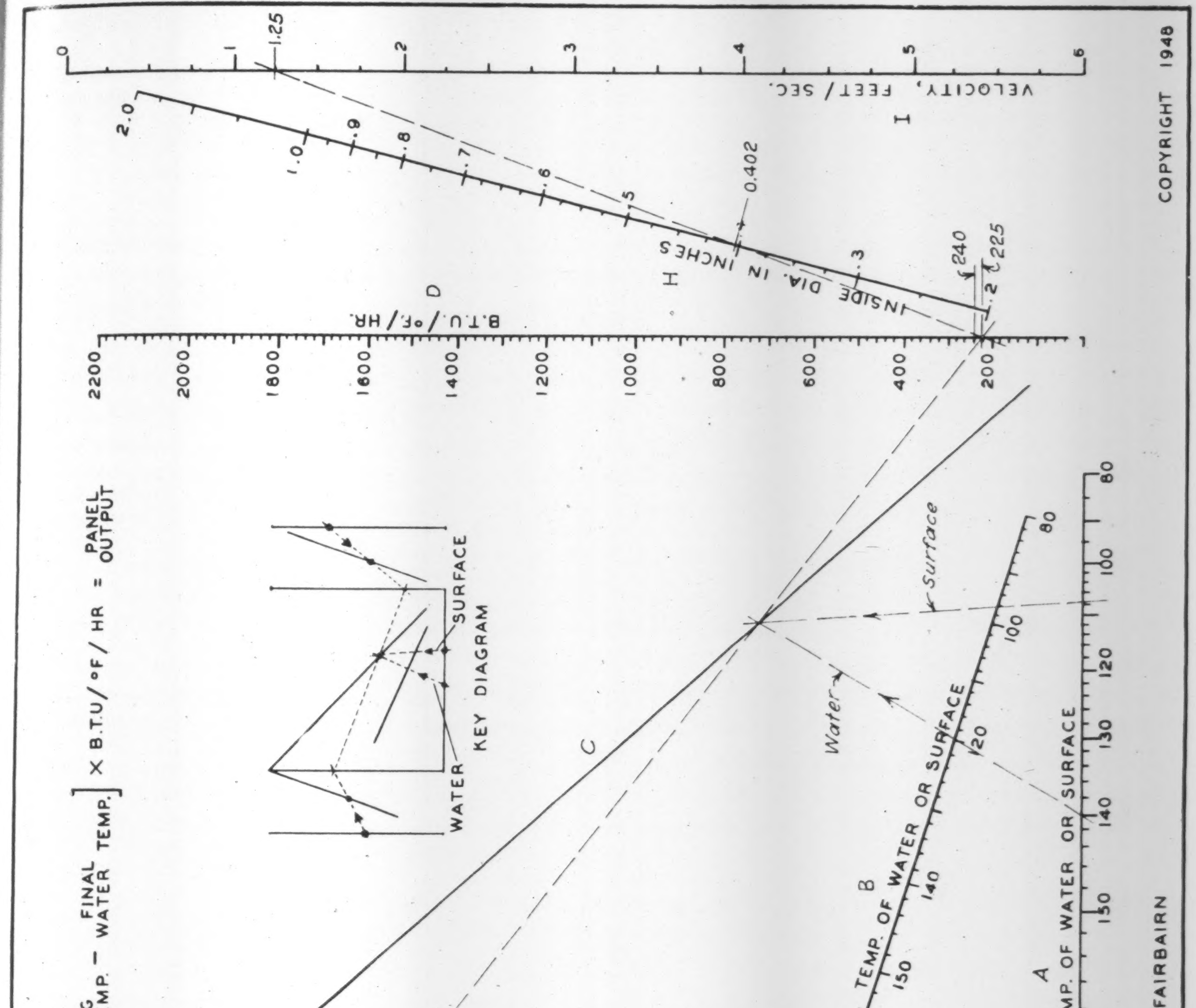
Referring to the accompanying chart, draw a line through 140 on scale "A" and 120 on scale "B" and let this line intersect scale "C".

4500 divided by the 20 F water temperature drop equals 225 Btu per hr per F. Therefore, locate 225 on scale "D" and run a line through this point and the previously determined point on scale "C" to intersect scale "E".

Next, locate 0.46 on scale "F" and run a line through this point and the previously determined point on scale "E". This line will intersect scale "G" at 170, indicating that 170 ft of tubing is needed (or 85 sq ft of panel area, inasmuch as the tubing is to be on 6 in. centers).

Checking the Chart Results

0.46 times (140-70) equals 32.2 and this multiplied by 2 (as the tubing is on 6 in. centers) gives 64.4 Btu per hr per sq ft. This gives


[ENTERING WATER TEMP. − FINAL WATER TEMP.] × B.T.U./°F/HR = PANEL OUTPUT
KEY DIAGRAM
WATER
SURFACE
VELOCITY, FEET/SEC.
0
1
1.25
2
3
4
5
6
I
INSIDE DIA. IN INCHES
2.0
1.0
.9
.8
.7
.6
.5
0.402
.3
240
.2
225
H
D
B.T.U./°F/HR.
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
C
Water
Surface
FINAL TEMP. OF WATER OR SURFACE
B
80
100
120
140
150
160
ENTERING TEMP. OF WATER OR SURFACE
A
80
100
120
130
140
150
160
E
LENGTH OF RUN
G
20
40
60
80
100
120
160
170
200
300
"U" COEF. - B.T.U./°F/FOOT OF LENGTH
F
0.46
1.8
1.6
1.4
1.2
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
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Nomograph for radiant heating design, an example showing use of which is given in the text

a 107.5 F surface temperature, in accordance with Nusselt's and the Stefan-Boltzmann methods for the output of a ceiling panel.

Set 107.5 F entering surface temperature on scale "A" of the chart. Run a line through this point on scale "A" and the previously determined point on scale "C". This line intersects scale "B", on which we find the final surface temperature of 96 F.

For total output, including attic loss, back track on the chart and substitute the total U coefficient of 0.49 on scale "F" and run a line through 170 on scale "G". Locate point of intersection on scale "E". Run line through this point on scale "E" and the point on scale "C", thus locating point on scale "D" which gives 240 Btu per F per hr. 240 times 20 F water drop equals 4800 Btu per hr total output.

To find the velocity, set 240 on scale "D" and inside diameter of 0.402 on scale "H". This line intersects scale "I", which gives a velocity of 1.25 fps.

Other radiant heating design methods we have used indicate that 200 ft of tube would be required for the conditions of our example. According to our chart, with 200 ft of tube the entering water temperature should be dropped to 130 F. Therefore, by using our chart, 30 ft less of tubing can be installed and the design water temperature of 140 F used, making a worthwhile saving in the amount of tube installed.

BUILDING INDUSTRY NEEDS BETTER STATISTICS

The building industry needs more accurate and complete statistics regarding construction demand and trends, particularly in the field of housing, according to James M. Ashley, president of the Producers' Council, national organization of building products manufacturers.

"There is urgent need for a census of housing in 1950, so that the interim statistics developed by federal agencies can be tested for accuracy. The data gathered in a new housing census, when matched with facts obtained in the first national housing census taken in 1940, might reveal many important facts not disclosed by the limited housing statistics currently being compiled by federal agencies operating with restricted funds," he says.

CONTRACTORS REVIEW AIR CONDITIONING SALES

In a session on equipment sales and merchandising methods presented at the third annual convention of the National Association of Refrigeration Contractors, J. J. Floreth, of Westerlin & Campbell Co., Chicago, described three "selling techniques" for air conditioning jobs falling in the 5 to 20 ton classification.

The first of these, he said, is the "engineering approach," which is the most common. This is a costly method, in his opinion, for jobs of this size range, especially when they are individually designed and bid on a competitive basis.

The "merchandising method"—his second classification—involves complete jobs quoted on a unit basis and including all auxiliaries. With this method, the air conditioning salesman can make a quotation on his first call. Mr. Floreth has not seen this procedure applied successfully to a large volume. Rising cost levels have been a factor adverse to a "sound construction equation." Also, the average buyer doesn't seem to like a promptly quoted overall price for an air conditioning installation, but apparently prefers a tailor-made approach, feeling that his needs are particular. This method leads to the loss of jobs where savings are possible, and the sales organization tends to wind up with those jobs where construction costs run higher than the average, Mr. Floreth said.

The third method is a "combination approach," where the packaged equipment is separated from the auxiliary construction work necessary. In this procedure, the equipment is sold by the merchandising method and the contracting work is sold by the engineering approach. This has a number of advantages.

The salesman is trained to sell the features of the equipment his organization handles and gets the order for the equipment only. He also sells the customer on the engineering and contracting skill of his organization. He explains to the customer, however, that his organization will provide the drawings and supervision at a flat rate so that any contractor can do the necessary auxiliary construction, if this is what the customer desires. By the use of this method, the salesmen don't need a "profound technical background" and wide experience in construction.

The size and scope of a particular project—and the chances of getting the job—may indicate reverting to the straight engineering approach in any specific case, even when the combination approach is regularly employed, Mr. Floreth said.

Room Air Conditioners

H. E. Wheeler, president of the Air Comfort Corp., Chicago, and new president of the National Association of Refrigeration Contractors, discussed selling room air conditioners at the same session. He stressed that continuity of effort is essential to success, and said that the room unit department must be entirely separate from the rest of the organization and must have some other product to sell to the same customers in the winter.

Customers must be sold on all the advantages of room air conditioners—not just cooling. Otherwise, sales are too dependent upon the weather. The customer must be told repeatedly what a good machine he has.

Complete inspection of the installed unit is good psychology, he said; never sell "just a little cooling," he warned.

It was decided at the convention to move the office of the NARC from Cleveland to Chicago, with headquarters at 228 N. LaSalle St., Chicago 1.

TO STUDY COAL REFUSE FIRES

Dr. E. R. Weidlein, director of the Mellon Institute, Pittsburgh, has announced the establishment there of a research fellowship by the Western Pennsylvania Coal Operators Association. The program will embrace scientific studies of the causes, prevention and control of coal refuse fires. Dr. William L. Nelson, who will head the fellowship, will investigate the reactions of coal and inorganic sulfides, especially at low temperatures, and will accord research to all factors entering into the problem of the spontaneous combustion of coal waste, particularly where piled.

PIPING NETWORK TO KEEP PUBLIC HIGHWAY ICE-FREE

Four Lane, 450 Ft Stretch Heated by Warm Well Water

In the first application of radiant heating technique to a public road, a 450 ft stretch of highway in Klamath Falls, Ore., will be heated in bad weather by hot water from an underground spring circulated through a network of welded pipe laid in the concrete. Four lanes wide, with an 8 percent grade, this dangerous road area is designed to remain clear and skidfree in all weather by automatically melting up to 1 in. of snow or 1/10 in. of ice per hr.

The stretch of all-weather heated pavement is on the Dalles-California highway leading into Klamath Falls from the north. It passes under the Southern Pacific railway viaduct and a few hundred feet farther crosses an irrigation ditch, thus necessitating a grade 2 or 3 percent steeper than would be normally used.

Work was started on the road late last spring after a 10 in. well had been drilled which struck a good flow of hot water at 390 ft. G. S. Paxson, bridge engineer for the Oregon state highway commission, developed the idea for the winterproof highway.

The hot well water itself is not run through the roadway piping. Instead, a coil of 2 in. pipe is submerged deep in the 190 deg well water. In effect, the well serves as a boiler. A pump sends ordinary water and antifreeze through the well coil, where it is heated or reheated to not less than 160 deg.

A 2 in. pipe runs from the well to the pavement, and then parallel to the road for a distance of about 400 ft. In the pavement slab is embedded 15,000 ft of ¾ in wrought iron pipe, made up into one grid for each of a series of 30 ft road panels. Each of these 15 panels is connected with the 2 in. water main through valves. The pipe was given a coating of asphalt before being laid in the concrete.

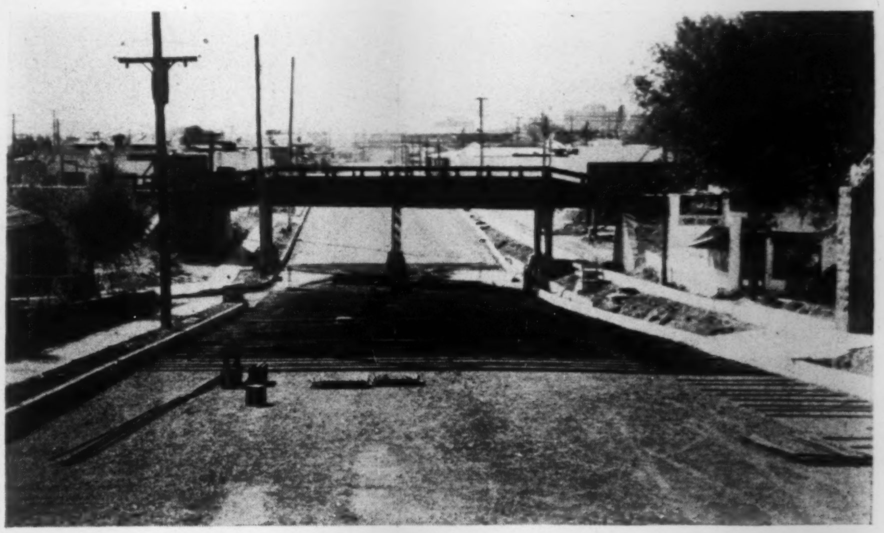
The 2 in. main and the series of grids comprise a closed circuit through which heated water is pumped, the valves insuring an even flow of water through each grid. Thus the whole 8 in. slab of road concrete may be warmed to snow-melting temperature.

The pump, thermostatically controlled, automatically begins to circulate the water when air temperature drops to freezing and continues to operate until the temperature rises above freezing. Another pump draws water from the well since it loses its heat value as the cool water flows from the road through the heat transfer coils. Hot water then bubbles up from the earth back into the well.

The natural hot water at Klamath Falls in southern Oregon is widely used. It has been tapped to heat 400 homes, a swimming pool, two hospitals, a high school, a new office building, several apartment houses, business buildings, and a newly-constructed veterans hospital. It is used for sterilizing dairy and soft drink bottles. Ranchers outside of the town use it to heat their poultry sheds and greenhouses and to warm drinking water for their stock. Geologists believe the water is heated either by hot underground lava or by chemical action.

Details of using the warm well water for a panel heating system in a service and repair garage at Klamath Falls were given in an article by Erwin L. Weber, consulting engineer, published in the December 1940 issue of HPAC. The "heating plant" for this garage consists of a 3 in. pipe extending down in a well to a depth of 450 ft and a 2 in. return riser enclosed in a 4 in. pipe with insulation between the 2 in. and 4 in. pipes. The panel heating water is warmed as it descends in the 3 in. pipe and is prevented from recooling as it rises by the insulation over the 2 in. pipe. It is circulated by a centrifugal pump driven by a 2 hp motor.

First application of radiant heating technique to a public road is at Klamath Falls, Ore., where a dangerous area is heated by hot water circulated through piping embedded in the concrete. The circulated water is heated by underground water



Night Air Cooling Proves Value for One-Story Office Structure

THE COOLING of an office with night operation of an exhaust fan that proved its value last summer is briefly described. A "flywheel effect" aids office comfort throughout the following day

GENERALLY speaking, summer conditions in the average office that is not air conditioned are uncomfortable—and they are at their worst when the office is under a flat roof. Btu's filtering in through the roof and walls cause the temperature to continue to rise after the office is closed. Some heat escapes during the night but office temperatures the following morning are approximately the same as the previous afternoon. A succession of hot days merely aggravates the situation.

Some improvement in comfort conditions can be provided with night operation of the exhaust fan. The circulation of the cooler night air, which may be some 20 deg less than the daytime temperature, will remove a large portion of the accumulated heat. Operating the fan during the major portion of the night will reduce the temperature of the office furniture as well as the building structure. Conditions in the office when it is opened in the morning will be much improved and the "precooling" will provide a "flywheel" effect to maintain this condition for several hours.

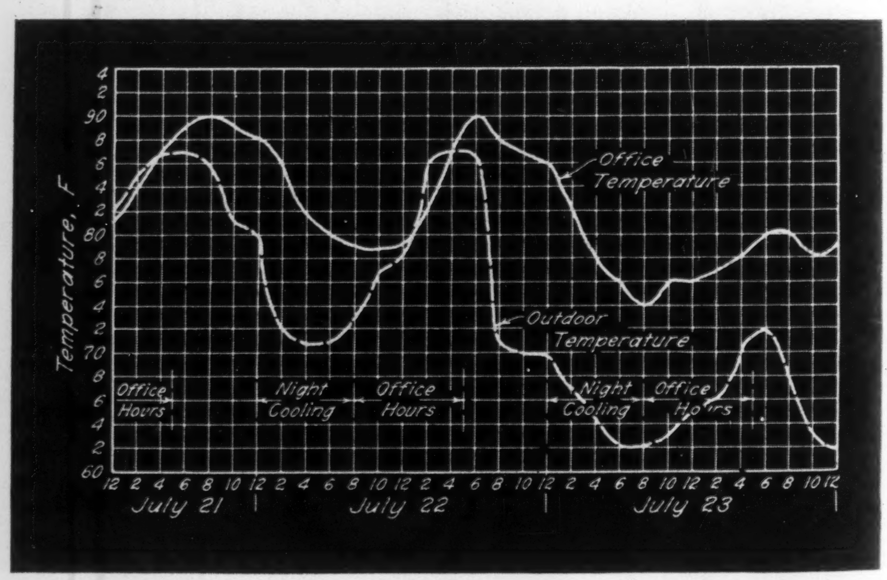
Scheme Tried in Sales Office

In order to gain some experience as to the cooling effect that can be expected with this fan operation, arrangements were made to use the fan equipment installed in a Chicago sales department office. The 24 in., 3000 cfm exhaust fan mounted on the north wall has capacity at high speed to provide a 3 min air change. Air enters the office through an open window on the south wall. Recognizing a dust problem because of a cinder covered lot on the south side of the building, filters were provided for the window. The filters are of the dry type, four of them providing 9 sq ft of face area. They are installed so as not to interfere with closing the window in winter. Louvers were constructed on the outside of the window for weather protection. The fan is turned on by the watchman at 12 o'clock midnight and continues to run until the office is closed the following afternoon at 5 p. m.

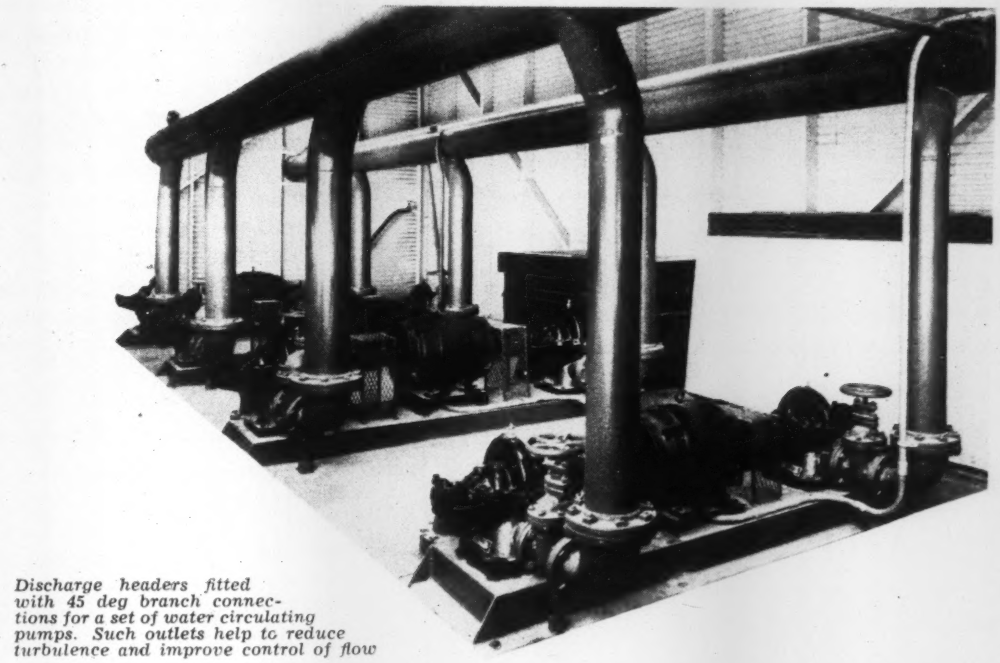
The accompanying chart is a graphic record of two-day operation. It clearly indicates the rise in temperature after 5 p. m., and also shows the lower outdoor night temperatures. The office temperatures drop quickly after the fan is turned on and are some 8 to 10 deg less than they would be without its operation. The flywheel effect of the night cooling is revealed in the office temperatures of July 22; although outdoor temperatures started to rise at 6 a.m., the office remained at a minimum until after 12 noon.

Operation of the fan equipment at this office is very satisfactory. Personnel are pleased with the comfortable conditions in the morning, the lasting effects, and the elimination of dust.

Results achieved over a two-day period with night operation of an exhaust fan in a one story sales office with a flat roof



Information from G. Gill Freyder, air conditioning engineer, Commonwealth Edison Co., Chicago.



Discharge headers fitted with 45 deg branch connections for a set of water circulating pumps. Such outlets help to reduce turbulence and improve control of flow

Basic Principles of Piping

(A Review of Fundamentals)

HERMAN VETTER, consulting engineer, Los Angeles, a specialist in industrial refrigeration, air conditioning, and ice rinks, gets down to fundamentals in the articles of which this is the second. His aim is not to replace existing publications on the subject of piping but to supplement them by discussing elementary principles

In no other field is the term "streamline" more applicable than in piping systems. A good example of streamline flow can be had by observing traffic flow on one of the modern superhighways, where streamline flow is achieved by avoiding narrow arteries, sharp turns, and conflicting currents. The same basic rule applies to good piping design.

When a reduction is made in the pipe line size, as illustrated in Fig. 1, abrupt change in size should be avoided. A fluid entering or leaving a reducing section of piping is affected in like manner as when entering the pipe. This action was illustrated in my article in the December issue, Fig. 8.

Types of Branch Outlets

Two types of outlets are shown in Fig. 1, "A" the tee type and "B" the 45 deg Y branch type. As the purpose of outlets is for diverting a portion of the flow, care should be taken in the design so that there will be a minimum of turbulence at or near the outlets; otherwise the quantity diverted through the outlets may not be enough to meet the design requirements. The 45 deg Y branch outlet will help to keep down turbulence and help the control of flow.

Reducing pipe sizes, as shown in Fig. 2, is usually done to economize in piping cost. Where the pipe line sizes are reduced, the cost of pumping is higher than if the piping is continued full size, as in Fig. 3.

Controlling Flow

Flow of fluid is governed by the size of opening and the difference in pressure between one side of the

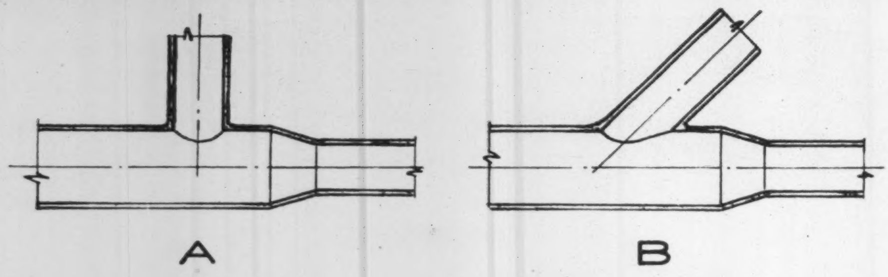


Fig. 1—Tee type and 45 deg type outlets, the latter helping to keep down turbulence and help the control of flow

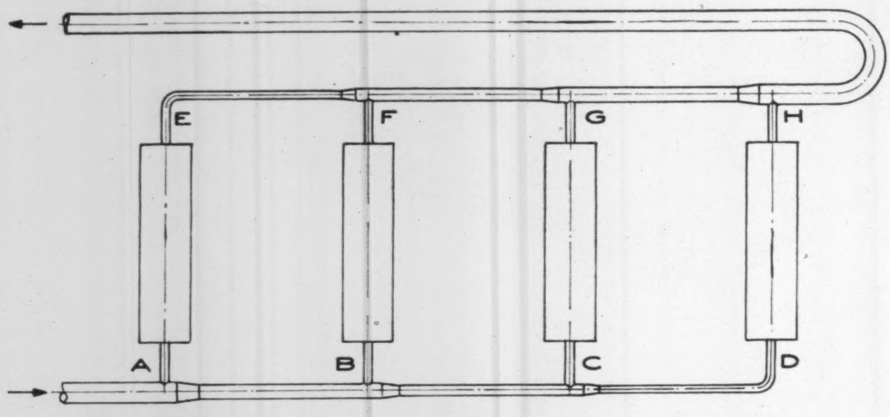


Fig. 2—Piping layout for supplying cooling water to four mills

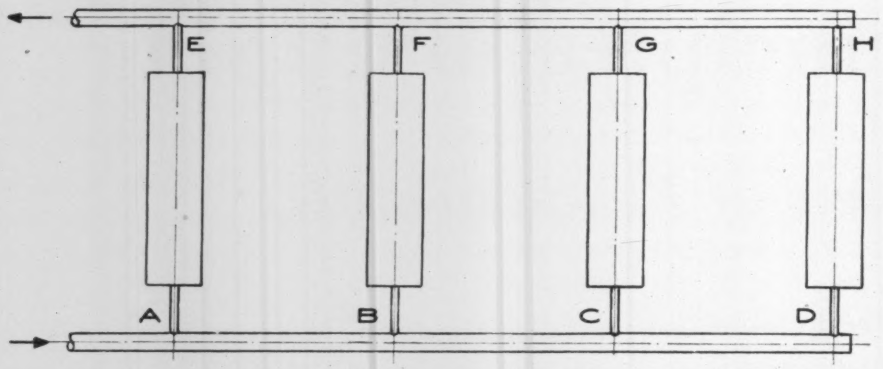


Fig. 3—If the piping of Fig. 2 is changed as shown here, power savings are made

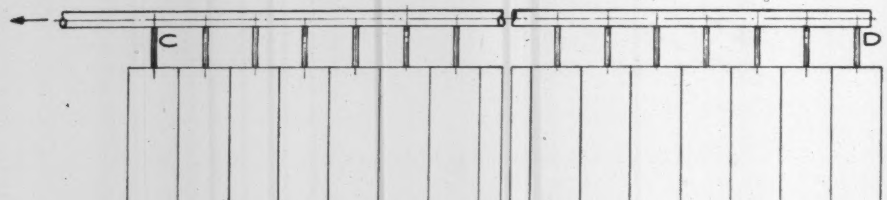


Fig. 4—Brine circulating lines for ice skating rinks present a condition where close regulation of flow is important

opening and the other. In the system as shown in Fig. 2, the resistance head through any one of the mills is the same. For instance, the head between points *A-E-H* is the same as between points *A-D-H* or any of the intermediate circuits. The flow, therefore, through each mill would be practically the same.

In the piping design as shown in Fig. 3, the resistance heads through the various units are not the same. The differences are as follows:

Location	Head, ft	Pressure, psi
A-E & A-B-F-E	1.29	0.56
A-E & A-C-G-E	1.91	0.82
A-E & A-D-H-E	2.05	0.86

Where fine adjustment of control is required, these indicated differences may be too much. These differences can be reduced by increasing the size of the headers.

The brine circulating lines to an ice skating rink present a condition where close regulation of flow is highly important. Fig. 4 shows diagramatically the supply and return headers for an ice skating floor having an area 100 ft wide by 220 ft long. Expansion joints are provided to allow for contraction of the metal when the brine is chilled to freezing temperatures. Valves are provided on the return header for regulating the flow to each floor section. These headers are 16 in. in diameter and distribute 5000 gpm of brine to 44 floor sections.

The differential in pressure between circuits *A-C* and *A-B-D-C* is 1.64 psi. When this rink was placed in operation it was not necessary to use the control valves because the flow was found to be sufficiently uniform to freeze ice of even texture.

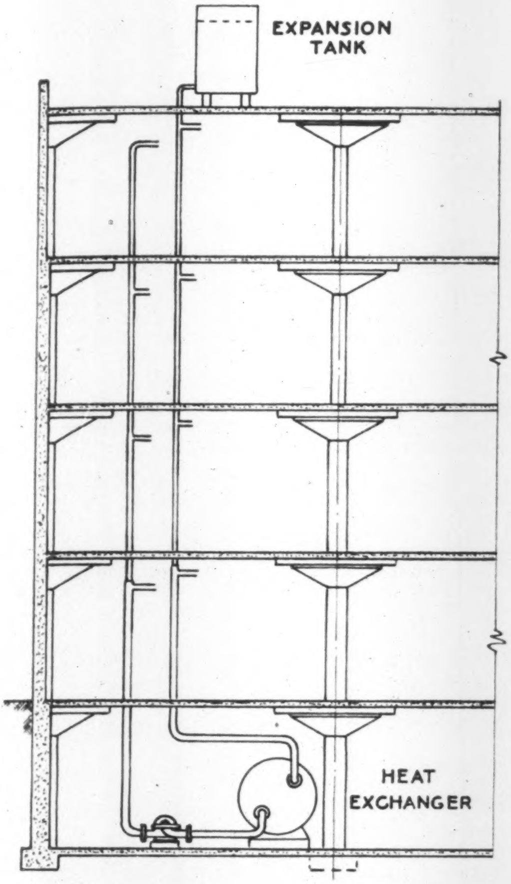
Types of Circulating Systems

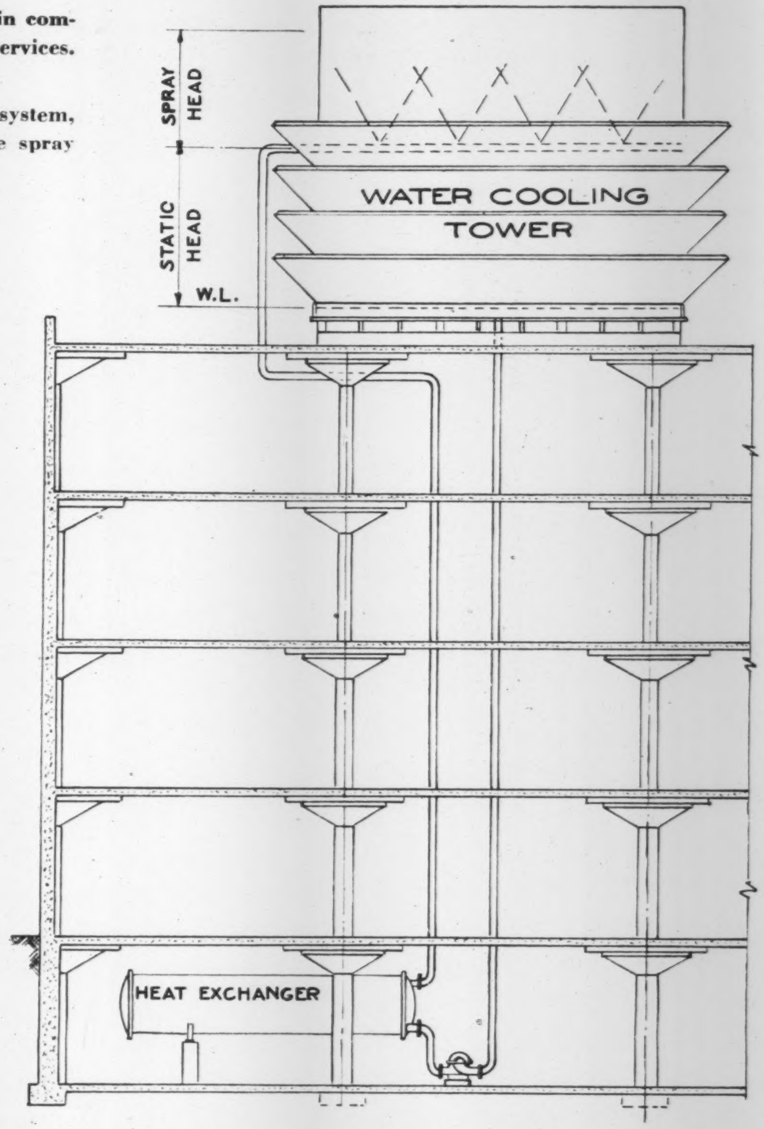
There are three main types of circulating systems in general use; the balanced system as shown in Fig. 5, the semi-balanced system as shown in Fig. 6, and the unbalanced system as shown in Fig. 7.

The balanced system is in common use for circulating hot water, chilled water, and low temperature brine for refrigerating purposes. This is a closed system; therefore, an expansion tank must be provided to allow for expansion and contraction of the circulating fluid due to temperature changes of the fluid. If the system has a displacement of 500 cu ft and it was charged

Fig. 5 (below)—A balanced system of circulation, in common use for circulating hot water and for other services.

Fig. 6 (right)—This is a semi-balanced circulation system, due to the static head from the water level to the spray header plus the head at which the sprays operate





with water at 70 deg temperature and the temperature was lowered to 32 deg, the water would decrease in volume to 499.1 cu ft. If the temperature of the water was raised to 100 deg, the volume would increase to 502.3 cu ft. If provisions are not provided to take care of the expansion of the fluid, a dangerous pressure condition could develop.

This system has a low power cost for operation because friction head and velocity head only must be considered in calculating the pumping power.

There are many cases where a fully balanced system is not possible. Fig. 6 shows a semi-balanced system for use where water is cooled in a tower for use in a heat exchanger (such as a steam condenser or a refrigerant condenser). The water in this system is under balanced condition up to the level of the water in the cooling tower basin; the unbalanced or static head is from this water level to the spray header plus the head at which the sprays operate.

There are conditions where the unbalanced system is the only one that can be used, such as that shown in Fig. 7. This shows a building supplied with water from a well. In this case, the pumping head consists of the suction lift plus the discharge static head in addition to the friction head and velocity head.

There are many variations of the three types of circulating systems shown in Figs. 5, 6, and 7. While the balanced system is the most efficient, it cannot be used for all purposes. There are buildings in which all three types of systems are required.

Pump With Suction Lift

Instructions for installing a water pump with suction lift are given in Fig. 8. When the suction lift is higher than 20 ft, the deep well type should be considered.

Only clear, cold liquids can be pumped with a suction lift. Hot liquids must flow to the pump under sufficient positive head to prevent vaporization at the impeller inlet. The positive head available must be exclusive of any vapor pressure due to temperature and minus head and friction losses. Net positive suction head (NPSH) is the term used to indicate the head available to move the liquid into the pump.

A pump of low speed will operate safely with a greater suction lift than one of a higher speed. Increased speeds without proper suction conditions often cause serious trouble from vibration, noise and pitting.

Keep the suction pipe short and direct.

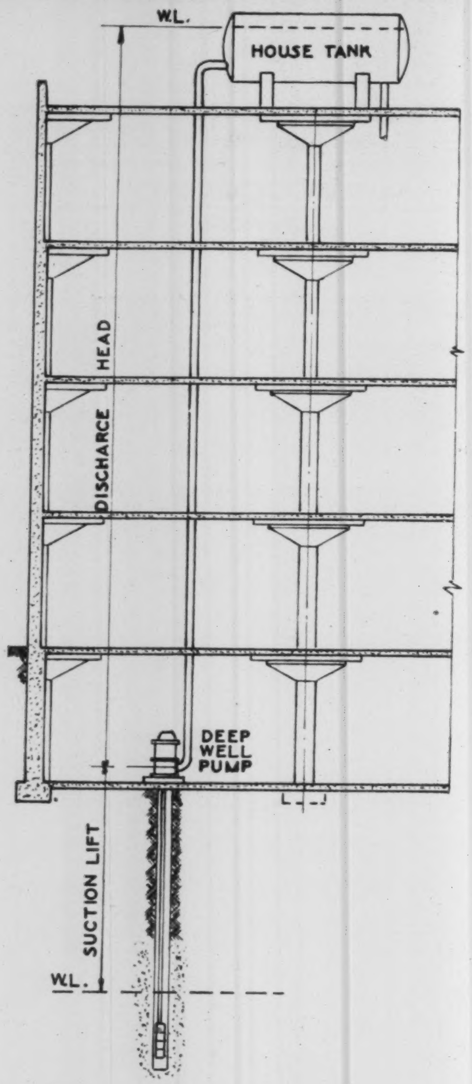
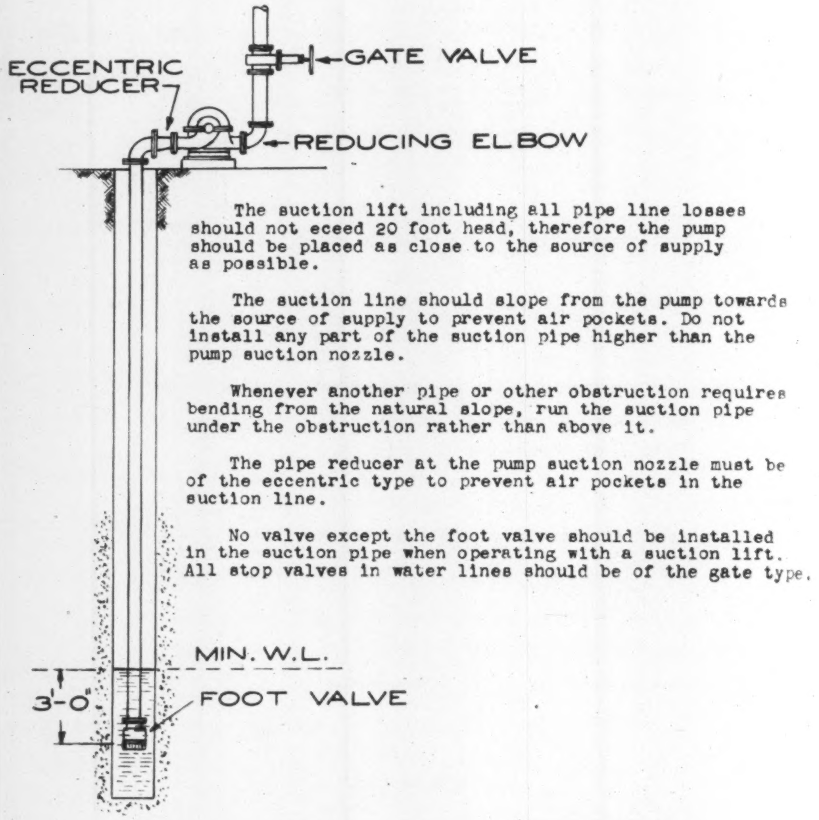


Fig. 7 (left)—There are conditions where only the unbalanced system can be used. Fig. 8 (below)—The author's suggestions for installing a water pump with a suction lift are given here



The suction lift including all pipe line losses should not eceed 20 foot head, therefore the pump should be placed as close to the source of supply as possible.

The suction line should slope from the pump towards the source of supply to prevent air pockets. Do not install any part of the suction pipe higher than the pump suction nozzle.

Whenever another pipe or other obstruction requires bending from the natural slope, run the suction pipe under the obstruction rather than above it.

The pipe reducer at the pump suction nozzle must be of the eccentric type to prevent air pockets in the suction line.

No valve except the foot valve should be installed in the suction pipe when operating with a suction lift. All stop valves in water lines should be of the gate type.

Use suction pipe at least one size larger than the pump nozzle.

Keep the suction pipe free of air pockets.

If more than one pump is used with suction lift, install a separate suction line for each pump.

The end of the suction pipe should be at least 3 ft below the minimum pumping level of the liquid being pumped.

The pump should never be throttled on the suction side.

The size of the suction and discharge piping should not be governed by the size of the pump nozzles. The pipe sizes should be based on the desired pressure drop.

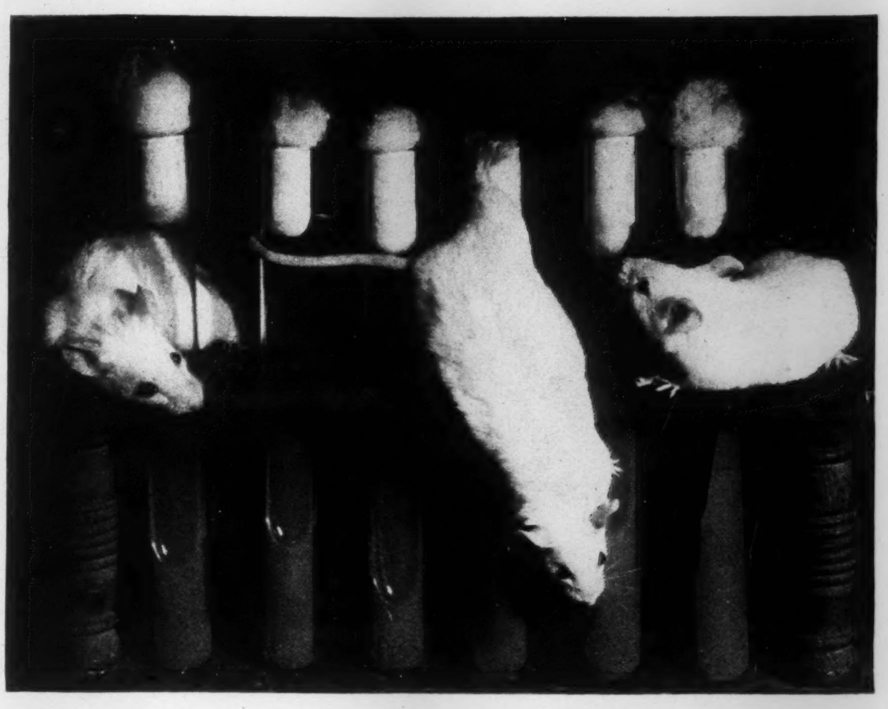
Capacities of centrifugal pumps are governed by the head under which they must operate. For instance, if a pump has a capacity of 500 gpm when operating at 50 ft head, it may only have a capacity of 400 gpm when operating at 70 ft head. If the operating head is less than that anticipated, the capacity of the pump will be greater and the power will also be greater with the result that the motor may be overloaded. If definite results are to be expected, the pump should not be selected until the head under which the pump must operate has been carefully calculated from the final piping plans.

A type of pump most commonly used is known as the double suction pump. In this type of pump, the impeller is a twin volute, and the water enters the center of the impeller from both sides. Because the water enters the impeller from both sides, there is no end thrust on the shaft and the impeller floats freely in the pump housing. If, however, the water does not enter the pump nozzle in an even flow, causing more water to flow into the impeller from one side than the other, an end thrust on the shaft will result causing excessive vibration and a loss in pump efficiency due to the retarded flow. In order to insure an even flow of water into the pump, no elbows should be connected to the pump suction nozzle horizontally. Elbows may be used if they are installed vertically.

Whenever possible, a straight section of pipe, as long as possible, should be placed between the pump suction nozzle and the first elbow to eliminate any turbulent flow entering the pump.

OVER $18 BILLION CONSTRUCTION FORECAST

The dollar volume of new construction in 1949 is expected to be about $18,175,000,000, or 1 percent higher than the year 1948 record-breaking total, according to a forecast prepared by the Producers' Council. The increase is anticipated in spite of a probable decline of about 5 percent in private building activity because of an expected rise of 19 percent in publicly financed construction.



White rats are very susceptible to respiratory diseases

Air Conditioning New General Mills' *Animal and Products Control Lab*

E. E. HERBACEK, Spencer Air Conditioning Co., Minneapolis, gives basic data on figuring air conditioning requirements for animal rooms in industrial laboratories and describes the new laboratories of General Mills, Inc., where a colony of 1800 white rats is used for tests of the nutritional values of products

DURING THE past several years, ready-mixed baking products have appeared on the shelves of food stores. These are the products of such suppliers as General Mills, Inc., Minneapolis, where extensive laboratories are maintained and staffed by technicians whose duties are to maintain and improve the texture and nutritional value of the product by laboratory research and tests.

In the new General Mills product control laboratory, the entire ground floor of this three story building is furnished with complete up-to-date laboratories and equipment for research and tests of nutritional values.

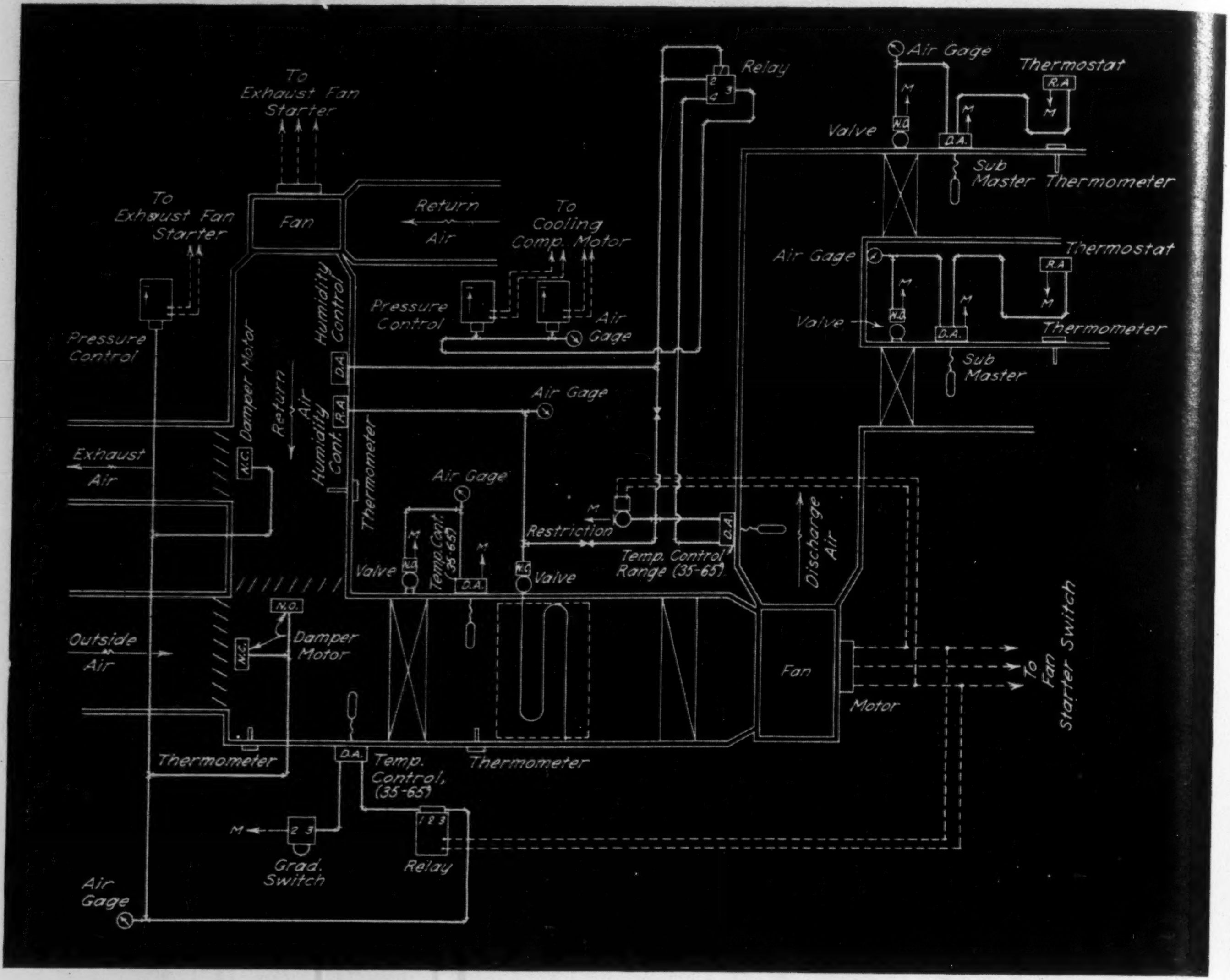
These laboratories include an animal colony of 1800 white rats on which tests are made for nutritional value of the products. These tests are conducted over a long period of time.

The nature of the research work in the laboratories housing the animal colonies requires (in addition to laboratory test equipment) extensive facilities for sanitation and proper care of the animals to prevent disease, as an epidemic can result in the loss of an entire animal colony—with the result that expensive research work would have to start all over again with a new colony.

It has been found from past experience and laboratory tests on colonies of white rats that these small animals are vulnerable and very susceptible to respiratory diseases, and for this reason the animal laboratories are isolated from the remainder of the general laboratories.

A factor of prime importance in reducing the mortality rate among the animal colonies is that of providing conditions of ventilation, room temperature, and humidity which will be conducive to a healthy atmosphere for the animals as well as the technicians.

The animals are usually housed


To Exhaust Fan Starter
To Exhaust Fan Starter
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Valve
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Sub Master
Thermometer
Air Gage
Thermostat
R.A.
Valve
N.O.
D.A.
Thermometer
Sub Master
Pressure Control
Pressure Control
Air Gage
Humidity Control
D.A.
Damper Motor
Return Air
Humidity Cont.
R.A.
Air Gage
Exhaust Air
N.C.
Thermometer
Air Gage
Temp. Cont. (35-65)
Restriction
Temp. Control Range (35-65)
D.A.
Discharge Air
Valve
N.O.
D.A.
N.C.
Valve
N.O.
Outside Air
N.C.
Damper Motor
Fan
Motor
To Fan Starter Switch
Thermometer
D.A.
Temp. Control, (35-65)
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Grad. Switch
Relay
Air Gage

Method of controlling the air system serving the animal rooms

in tiers of wire cages grouped together and mounted in an angle iron framing equipped with casters to facilitate moving an entire test colony from one laboratory space to another.

Temperature and Humidity Requirements

These small animals have a higher normal metabolism rate than a human, and being confined to a limited amount of activity, thrive best in a room temperature of 74-76 F, and a relative humidity of 45 percent.

In the design of animal laboratories, the space requirements depend on the kind of animal and the average weight for the total number to be accommodated. Usually three kinds of animals are used for experimental purposes: white rats, rabbits, and guinea pigs.

White rats, used in this particular case, normally weigh from 0.125 lb for the young ones to 0.75 lb for the adults, and will average 0.50 lb each for a colony. The room to accommodate the animals and laboratory workspace will amount to a total of 8.5 cu ft per animal, based on a minimum ceiling height of 9 ft 6 in. The animal cages will occupy approximately half of this space, or about 4 cu ft per animal.

The minimum air volume circulated, based on load calculations, amounts to 1.25 cfm per animal, or 2.5 cfm per lb of animal. Of this total volume circulated, a minimum of 20 percent is introduced from the outdoor for ventilation purposes as as well as for displacement of ammonia gases. This amounts to 0.25 cfm of outdoor air per animal, or 0.50 cfm of outdoor air per lb of animal.

The construction details for exposed walls of such rooms are of importance. These walls should be, if possible, windowless and properly insulated with at least a 2 in. thickness of vermin- and waterproof rigid insulating board having a vapor seal of metal foil under the interior plaster finish. Such construction of exposed wall surfaces is required to maintain a surface dewpoint temperature at least (or above) that of the air being introduced to the space, to eliminate condensation and also to make possible maintaining uniform temperature and relative humidity over the entire room area served.

Heating of such rooms by direct radiation should be avoided because of the injurious effect to animals caged directly near the radiators.

Separate System for Animal Rooms

Air conditioning was necessary for the General Mills laboratory building to provide conditions for the control of various research laboratory processes, as well as the particular requirements of the animal laboratories. It was therefore decided to treat these spaces by a separate and entirely independent air conditioning system from the remainder of the building.

This system is designed for a closed cycle of operation with independent room supply, return and exhaust air ducts from air mains run along the corridor.

The supply air system is zoned for the two animal laboratories on each side of the corridor, and air is supplied to and exhausted from each room through combination supply and extract air diffusers mounted on ceiling branch ducts.

These diffusers are located and spaced so as to obtain a small radius of air diffusion required to cover small areas of the room and eliminate perceptible movement of air currents. A combination return and exhaust fan is connected between the return air tunnel and the equipment to obtain a positive exhaust from each room and provide a means of maintaining a static pressure balance within the laboratory spaces.

This static pressure balance is important in an application of this type to prevent the infiltration of air which has not been treated to the rooms.

In this particular installation, all of the air introduced to the animal rooms is first processed through a combination electrostatic and dry type cleaner, which serves the dual purpose of removing 95 percent of all dust particles from the air and isolating and destroying airborne germs.

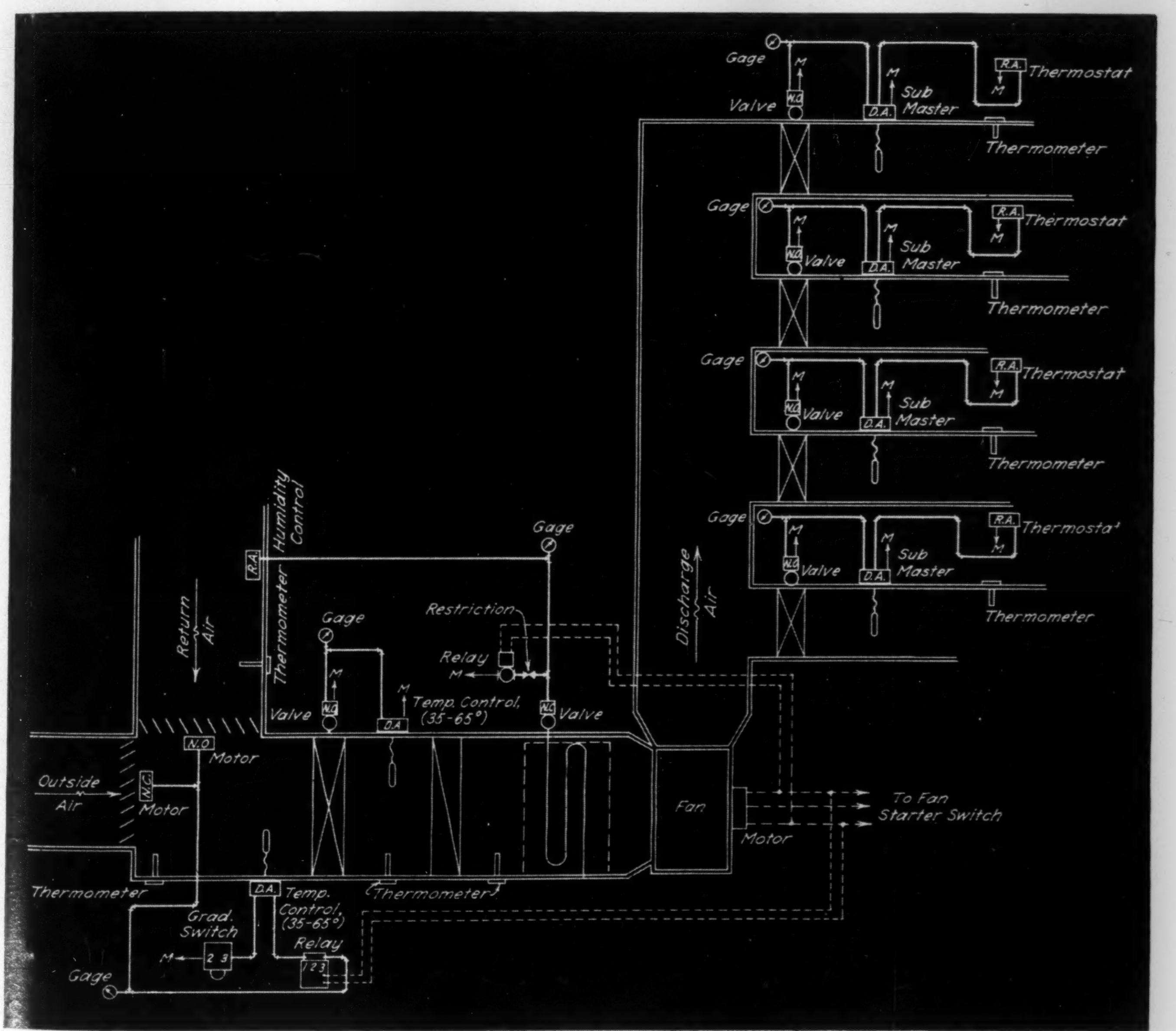
After the initial cleaning, the air is passed through an activated carbon canister cell unit installed for the purpose of removing injurious gases or fumes present in the outdoor air introduced to the system, which may be contaminated by the various neighbor industries located in the close vicinity, as well as for removing animal odors from the recirculated air.

From the carbon unit, the air enters the main air conditioner unit, which consists of a one row, steam distributing tube type, preheater, a six row direct expansion "Freon" refrigerant air cooling and dehumidifying coil, a vaporizing flash type pan humidifier, and the main air circulating supply fan.

Zone reheaters or booster coils are located in the two independent zone supply air ducts serving the animal rooms.

Cooling and dehumidification of

This diagram shows the control layout for the products control laboratory system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R.A.
Humidity Control
Thermometer
Return Air
Gage
Gage
Restriction
Relay
M
Discharge Air
M
Valve
N.O.
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Temp. Control, (35-65°)
D.A.
N.C.
Valve
N.O.
Motor
Outside Air
N.C.
Motor
Fan
Motor
To Fan Starter Switch
Thermometer
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Temp. Control, (35-65°)
Thermometer
Grad. Switch
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Relay
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Gage

the air is accomplished by a 20 hp refrigerating machine equipped with automatic capacity unloaders and automatic suction pressure controller to maintain a 35 F evaporator temperature. This machine is on the line the year around (24 hr a day) to provide the cooling and dehumidifying requirements of the rooms on demand of the master control instruments which are located within the zone areas served.

The automatic temperature and humidity control system is of the pneumatic type, arranged and designed for year around control of conditions within the animal rooms by the modulating of automatic proportioning type valves on preheaters, zone heaters, and humidifiers.

Thermal expansion and automatic liquid magnetic stop valves are installed on the two circuit refrigerant coils which are actuated by the dewpoint control instrument.

Automatic dampers are provided for outdoor air intake, recirculating, and exhaust air. These dampers are of the proportioning type arranged so as to introduce to the building a minimum of 20 percent of outdoor air, recirculating 80 percent and exhausting 15 percent, which allows 5 percent for leakage due to the static pressure maintained within the spaces served.

The system has a total air handling capacity of 4200 cfm, of which 2300 cfm is supplied to the four animal lobaroatories, the remainder being supplied to the other general laboratory spaces located on the ground floor of the building. Numerous independent exhaust systems are installed to provide ventilation for sterilizers, washers, test cabinets, etc., which obtain their air supply direct from the outdoors to eliminate additional and unnecessary air capacity through the air conditioning system.

A refrigerated cold storage room is provided for the storage of perishable products used in the laboratory tests. This room is maintained at a temperature of 40 F by a ½ hp "Freon" refrigerating machine connected to a blower type air cooler unit.

The second and third floors of the building are served by a separate air conditioning system having four air and control zones, one for each half of each floor. This system has a capacity of 16,800 cfm required to maintain temperature and relative humidity conditions in the products control and baking laboratories located on these two upper floors.

The unit consists of cleanable cell type air filters, preheating coils, zone reheat coils, and vaporizing pan humidifier. The zones are arranged to maintain temperatures for each exposure for the two floors, as well as providing a means of maintaining a higher temperature and relative humidity required in the baking laboratories on the second floor.

During winter operation, the system maintains temperatures of 74 F and 50 percent relative humidity, and 80 F temperature and 50 percent relative humidity during summer operation.

Automatic temperature and humidity controls are of the pneumatic type with all valves and dampers having modulating features required to maintain conditions conducive to good baking practice and nutritional laboratory tests. A 40 hp "Freon" refrigerating machine is installed in connection with this system for cooling and dehumidifying during summer operation.

Distribution of the air to the various laboratory spaces served is accomplished by adjustable double deflection grilles which can be adjusted for both vertical and horizontal air diffusion.

In addition to the air conditioning system, there are also numerous exhaust ventilating systems installed. These are required to remove fumes, steam, and heat from laboratory test cabinets, sterilizers, and ovens. In most cases this exhaust ventilation is through hoods provided with slotted panels. Velocities of 300 fpm are maintained over the slot areas, which are arranged and located so as to provide a source of clean, fresh air within the breathing area of the technicians.

The source of air supply required by the exhaust ventilation systems is mostly outdoor air introduced through the air conditioning system, which is provided by means of the outdoor air damper controller which opens to a minimum position at the start-up of the air conditioning fan, and modulates to maximum opening by a control instrument installed in the air mixing chamber.

SEES LESS NEED FOR DEGREE DAY FIGURES

WITH THE advancements which have been made in air conditioning and heating over the past decade (and which are continually being made) the degree day, together with other formerly useful factors, can no longer be recognized as anything other than a very general indicator upon which to base only very approximate demand information. Unless the engineer, the utility, or the consumer using degree day data can absolutely disregard the effects of wind velocity and humidity in connection with the particular heating or air conditioning problem and the coincidental effects of dry bulb temperature and wind and humidity, degree day data have no value today.

Since wind velocity is a factor very definitely influencing the heat loss of a structure, fuel consumption curves may well follow wind velocity curves with a greater degree of accuracy than they do the dry bulb temperature. Since the latent or moisture load is almost always the greater factor in air conditioning involving cooling and dehumidification, a power consumption curve will more accurately follow fluctuations in seasonal wet bulb than in seasonal dry bulb temperature upon which the degree day is based. The diurnal characteristics of both the wet and dry bulb curves are important factors not only in determining total loads and the selection of adequate and economical equipment but also in the determination of energy consumption over a season, because the operation of most systems is during a *selected segment* of the 24 hr cycle. Temperatures occurring in the nonoperating segment of the cycle would have no influence on either design, load requirement, or energy consumption.

For accuracy commensurate with progress in heating, ventilating and air conditioning, tabular weather data giving the *maximum* and the *average* wet bulb, dry bulb, dew point, and wind velocity, and coincidental extremes during the 12 hr day and night portions of the 24 hr day, are a necessity.—THOMAS H. URDAHL, Urdahl and Everetts, consulting engineers, Washington, D. C

DATA SHEET

INSTRUCTIONS FOR INSTALLING AND OPERATING RECIPROCATING PUMPS

THE FOLLOWING *instructions for installing and operating reciprocating pumps have been reprinted by permission from the reciprocating pump section of the Standards of the Hydraulic Institute, copyright, 1948, by the Hydraulic Institute, New York. The original numbering of paragraphs is retained.*

D-72. Location. Locate the pump in an accessible place, so it can be inspected at regular intervals during operation. Place pump as close to the liquid supply as possible, so as to make suction pipe short and direct. Provide ample head room for crane, hoist or tackle.

D-73. If it is necessary to place the pump in a pit, provision should be made to protect the pump from water that may come into the pit from seepage or flood.

D-74. Whether mounted on the floor, on a foundation above the floor level, or in a pit, sufficient room should be allowed for removal of piston or pistons, as well as rods, for repacking or replacement.

D-75. Foundation. Pump must have a good foundation, preferably of concrete, about 10" or 12" above level of surrounding floor. Locate foundation bolts according to drawing or template.

D-76. It is better to have foundation bolts longer than actually required. They can then be cut off after the pump is in place and the nuts drawn down. This will avoid foundation bolts being too short if it is necessary to shim up the pump to make it level.

D-77. Use pipe sleeve of a size about two and one-half times the diameter of foundation bolt (2½" pipe for 1" bolt).

D-78. In the case of steam pumps, the steam end should not be bolted down too tightly, but should be allowed to "float" to take care of expansion, when hot.

D-79. Discharge Piping. To protect the pump, a gate valve and check valve should be installed in the discharge pipe close to the pump. Check valve should be placed between pump and gate valve. If reducers are used on the discharge side to increase the size of discharge piping, they should be placed between check valve and pump.

D-80. Relief Valve. The insertion of a relief valve of suitable size for the capacity of the pump, set to open at a pressure slightly in excess of the maximum working pressure required of the pump, is highly recommended because of the added safety it affords. The relief valve should be placed in the discharge line as near to the pump as possible and ahead of any other stop or check valve that may be located in the discharge line. In the case of a steam pump, if the ratio of steam and fluid cylinders is such that an excessive discharge pressure cannot be produced, the relief valve is not absolutely essential, but one should always be installed in the discharge line from a power pump.

D-81. Suction Piping. The suction piping should be as direct and short as possible and at least one or two sizes larger than the pump suction. Length and size are determined by the maximum allowable suction lift which should never exceed 22 feet (friction included). Where changing from one pipe size to the other, standard ASME suction reducers should be used. Hot liquids must flow to pump suction by gravity. Pipe should be laid out so that air pockets are eliminated. It should be tested with pressure for leaks.

D-82. Foot Valve. When working on a suction lift, a foot valve placed in the suction line will keep pump primed so long as the foot valve is leak tight. The net area of the foot valve should be at least equal to the area of suction pipe, preferably larger.

D-83. Strainer. To protect the pump from being clogged with foreign matter, a strainer should be installed with a net area of a least three or four times the area of the suction pipe.

D-84. Piping. Pipes must line up naturally. Do not force them into place with flange bolts, as this may draw pump out of alignment. Pipes should be supported independently of pump so as not to put any strain on it.

D-85. Flanged fittings or unions should be used close to the pump in all pipe lines connecting to it, so as to facilitate removal of pump should this become necessary.

D-86. After the piping has been installed, the alignment should be checked again, and if necessary, corrected.

D-87. Erection. Small pumps are lined up and rigidly bolted together before leaving the factory and do not require alignment after being set upon the foundation. It is, of course, important that the entire pump be properly leveled, being careful not to spring the pump out of alignment when securing it to the foundation. The erection of large size pumps that are shipped in sections should be under the supervision of a competent erector, as it is necessary to carefully align the liquid ends with their steam or power ends after they have been placed upon the foundations.

D-88. Flexible Couplings. A flexible coupling will not compensate for misalignment of the pump and driver shafts. The purpose of the flexible coupling is to compensate for temperature changes and to permit end movement of the shafts without interference with each other while transmitting power from the driver to the pump.

D-89. Types of Misalignment. There are two forms of misalignment between the pump shaft and the driver shaft.

(a) Angular misalignment—shafts with axis concentric but not parallel.

(b) Parrallel misalignment—shafts with axis parallel but not concentric.

D-90. Leveling the Unit. The coupling should not be connected until all alignment operations have been completed. Metal blocks and shims or metal wedges having a small taper should be placed close to the foundation bolts. On large units, small jacks made of cap screws and nuts are very convenient. In each case the supports should be directly under the part carrying the greatest weight and spaced closely enough to give uniform support. A spacing of 24" is suggested on medium size units. A gap of about ¾" to 1-½" should be allowed between the baseplate and the foundation for grouting.

Adjust the metal supports or wedges until the shafts of the pump and driver are level. Check the coupling faces, suction and discharge flanges of the pump for horizontal or vertical position by means of a level. Correct the positions, if necessary, by adjusting the supports or wedges as required.

D-91. Flexible Coupling Alignment. The faces of the coupling halves should be spaced far enough apart so that they cannot strike each other when the driver rotor is moved hard over towards the pump. A minimum dimension for the separation of the coupling halves is usually specified by the manufacturer. The necessary tools for approximately checking the alignment of a flexible coupling are a straight edge and a taper gage or a set of feeler gages.

Note: On certain large units, limited end float couplings are used and the Instruction Book furnished with such units should be consulted for the special alignment instructions that apply to such couplings.

A check for angular alignment is made by inserting the taper gage or feelers at four points between the coupling faces and comparing the distance between the faces at four points spaced at 90° intervals around the coupling. The unit will be in angualr alignment when the measurements show that the coupling faces are the same distance apart at all points.

A check for parallel alignment is made by placing a straight edge across both coupling rims at the top, bottom and at both sides. The unit will be in parallel alignment when the straight edge rests evenly on the coupling rim at all positions. Allowance may be necessary for temperature changes and for coupling halves that are not of the same outside diameter. Care must be taken to have the straight edge parallel to the axis of the shafts.

Angular and parallel misalignment are corrected by adjusting the wedges or shims under the baseplate. After each change, it is necessary to recheck the alignment of the coupling halves. Adjustment in one direction may disturb adjustments already made in another direction. It should not be necessary to adjust the shims under the pump or driver or to relocate factory aligned units.

The permissible amount of misalignment will vary with the type of pump and driver. The manufacturer's recommendations should be obtained.

D-92. Alternate Method of Alignment. An approved method for putting the coupling halves in final accurate alignment is by the use of a dial indicator. Check alignment by straight edge, taper gage or feelers as accurately as possible by procedure indicated above.

Bolt the indicator to the pump half of the coupling, with the indicator button resting on the other coupling periphery, set the dial to zero, and chalk mark the coupling half at the point where the button rests. For any check, top or bottom or sides, rotate both shafts by the same amount; i.e., all readings on the dial must be made with its button on the chalk mark.

The dial readings will indicate whether the driver has to be raised or lowered or moved to either side. After each movement, check that the coupling faces remain parallel to one another.

Example: If the dial reading at the starting point is set to zero and the diametrically opposite reading at the bottom or sides shows a plus or minus .020", the driver has to be raised or lowered by shimming, or moved to one side or the other by half of this reading.

Note: For all checks, including that for parallelism of coupling faces, keep both shafts pressed hard over to one side when taking the readings.

D-93. Aligning Gear Type Couplings. Gear type couplings are aligned in the same manner as outlined above. However, the coupling covers must be moved back out of the way and measurement made on the coupling hubs.

D-94. Grouting. When the alignment is correct, the foundation bolts should be tightened evenly but not too firmly. The unit can then be grouted to the foundation. The frame or baseplate should be completely filled with grout, and it is desirable to grout the leveling pieces, shims or wedges in place. Foundation bolts should not be fully tightened until the grout is hardened, usually about 48 hours after pouring.

D-95. Final Check of Alignment. After the grout has set and the foundation bolts have been properly tightened, the unit should be checked for parallel and angular alignment, and, if necessary, corrective measures taken. After the piping of the unit has been connected, the alignment should be again checked.

The coupling halves can then be reconnected, and after the unit has thoroughly warmed up under normal operating conditions, it should be shut down and immediately checked again for alignment of the couplings. All alignment checks must be made with the coupling halves disconnected and again after they are connected.

It must be emphasized that attempts to correct alignment in one direction may alter the alignment in the other direction, therefore, it is necessary to check in all directions after making any adjustments.

D-96. Factors That May Disturb Alignment. The unit should be periodically checked for alignment. If the unit does not stay in line after being properly installed, the following are possible causes:

(a) Settling, seasoning or springing of the foundation.

(b) Pipe strains distorting or shifting the machines.

(c) Wear of the bearings.

(d) Shifting of the building structure due to variable loading or other causes.

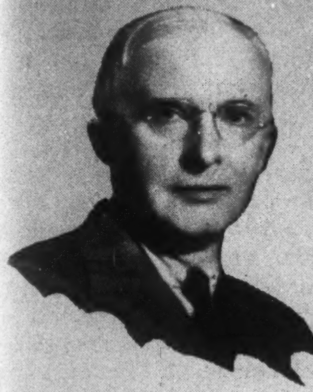
It may be necessary to slightly readjust the alignment, from time to time, while the unit and foundation are new.

D-97. Priming. For quick starting, connect priming pipes to a supply above the pump.

D-98. Non-Metallic Piston Packing for Piston Type Pumps. Fibrous piston packing swells when wet. The amount of packing swell increases with increased temperature of liquid handled. Reasonable allowance is made for this swelling when fitting fibrous rings to pump liquid pistons at the factory. However, it frequently occurs that the expansion of the packing in any particular installation is greater than anticipated. Excessive expansion causes the fibrous rings to be clamped tightly between the piston head and follower, and to be forced out against the cylinder lining. When this takes place the ring acts as a lap, resulting in rapid wear of the cylinder lining, and in some cases in breakage of the piston or follower.

Previous to starting up a piston pattern pump for the first time, the piston packing should be inspected to see that it is free in the packing recess. If the pump when running shows evidence of excess load or "squeals" in the liquid end, the packing should be examined. Fibrous packing rings can be properly fitted to pistons by submerging them in water at the pumping temperature for a few hours and then peeling off one or more layers of fabric on one or more rings so as to just neatly fill up the available packing space.

[Publication of these instructions for installing and operating reciprocating pumps will be completed next month, covering air chambers, lubrication, valve setting, drains, power pump gear drive, power pump bearings, and inspection.]



SAM LEWIS' PAGE

Informal comment on heating, piping, and air conditioning matters is given in this regular feature by Samuel R. Lewis, consulting mechanical engineer, member HPAC's board of consulting and contributing editors

Practical Pointers When Using Radiant Heating and Radiators

You could fill a book—easily—with just a few of the strange situations that engineers and contractors run across in their daily work (like the air duct in a theater we heard about the other day that's supposed to supply outdoor air and to exhaust lobby air to the outdoors at the same time) . . . Mr. Lewis describes a building with floor radiant heating, direct radiators, and convectors—except that no one could find the underfloor coils! He gives some practical suggestions on installations where both radiant heating coils and radiation are to be used

STILL MORE fun with radiant heating keeps cropping up in my engineering practice.

A large and modern building tried to be sold on the advantages of radiant heating that was claimed to be in the floor. There is no basement. The floor coils were alleged to be ¾ in. pipe placed in sand under a 4 in. thick slab. The building and the heating plant are nine years old. No one has been happy living in it as far as thermal reactions are concerned.

An oil burning boiler and a single pipe main with scoop fittings to promote circulation to the heat transmitting units were installed.

There is a second story, and the first and second stories are connected by an open stairway. The second story rooms have free standing, conventional radiators in some rooms, and recessed convectors in other rooms. The first story rooms —which are essentially one great room—have several free standing radiators and some finned baseboard radiation. There is a conservatory, equipped with cast iron wall type radiators laid flat under the plant benches.

The drawings and the representations of the seller indicate that the concrete first story is underlaid with the invisible pipe coils in addition to the radiators that any one can see. No valves, either for air removal or for controlling heat output from the radiant coils, are visible.

There are three water circulating pumps—one for the second story, one for the first story, and one for the conservatory. All three use 200 deg water direct from the boiler.

The Search for the Coils

I explored the walls and floors first by manual contact and then with a special thermocouple. There was no evidence of any temperature increase above the underfloor coils compared with the assuredly coil-free areas.

The course of the single main that serves the first story free standing radiators could be located without question. If there was any doubt about where this main ran, one could follow it visually by the definite cracks in the concrete that followed its path.

If there were any pipe coils under the floor, they were not circulating and by the design evidence they almost surely could not circulate, since they were shown of the header type with the headers and runs being all of the same diameter pipe and entirely innocent of any distributing or control valves.

The water, supposed to heat the radiant coils, was to be at 200 deg.

We chopped openings through the concrete, so as to be positive concerning the radiant coils that were shown on the drawings and specified, but that seemed to be missing. We found out that there are no radiant heating grids or coils under the floor! The seller evidently felt that the warm, cracked open concrete above the single main hot water circuit was worthy to be called radiant heating.

This building is short about 25 per cent of the necessary heat supply. It will cost about one-third of the exorbitantly high asking price to correct the deficient mechanical equipment.

Keep Floor Coils on Separate Circuit

The lessons are:

a) When you pay money for radiant heating in an existing structure be sure the radiant heating surfaces are present.

b) Be sure—if the job is one using both radiant underfloor coils and exposed radiators—that the floor coils are on a separate piping circuit, with water not hotter, ever, than 120 deg. Observe that any convectors must have water at a temperature approaching that of steam or they will not work well, since a sharp temperature difference between water and air is necessary.

c) Any alleged underfloor coils must have positive means of air venting, and of compelling all the component pipes to take their allotted share of the water. The headers (if, indeed, headers must be used) should be equivalent in capacity to the sum of the capacities of the branches.

I do not condemn a split or divided heating system for a room or a building, in which some low temperature heat transmission is combined with hot exposed radiators. I do condemn a heating system that uses the hot-hot water for both types of heat transmission. Anyone who, on ripping up the carpet as I did in this building, finds wide cracks in the concrete following the pipes, would agree with me.

I do believe that the occupants of a building divided between radiant heating and convector heating, will be unhappy when leaving a radiant zone where the air temperature may be 5 deg cooler than in the zone heated by convectors.

Liberation of Steam in Cast Iron Boilers

I THINK Samuel R. Lewis did an excellent job in his article on using cast iron sectional boilers in the December HPAC — particularly in stressing the importance of heating surface, etc. But there is one section of the article dealing with the design of sectional boilers which I believe might create a wrong impression in the minds of many readers.

I refer to the group of three paragraphs beginning "Liberation of steam from the surface of the water in the relatively small cast iron tubes, etc.". I know that Mr. Lewis is making a point that internal push nipple boilers (including our current models) are being made with large top nipples, so that the water can circulate through this nipple from section to section and that this permits the installation of a builtin hot water heater right in the boiler itself—which, of course, is a distinct advantage.

On the other hand, as far as actual steam properties go, a boiler will steam faster with a resulting better pickup of heating load, when a large number of vertical water tubes are used with steam disengaging from each tube into a steam dome in each section. Obviously, this does result in a somewhat more uneven water line, but unless the water is dirty or alkalined this relative unevenness doesn't in any way unfavorably influence actual boiler performance. As a matter of fact, should there be a quantity of grease or dirt in the boiler, which would result in greater than average water surface tension, steam would be less impeded with a group of small tubes than it would with a large flat surface.

In other words, what Mr. Lewis has said about this problem is, substantially, that a pure breed race horse may in certain instances be more nervous in temperament than an average farm work horse. This is probably very true . . . . but it is also true that the race horse can and will run faster.

We have no particular objection to these paragraphs in Mr. Lewis' article, but we do want to point out something which to us, as designers and builders of cast iron boilers for over 90 years, seems to be just one side of the story about one problem in boiler design.—J. E. **Reed**, The H. B. Smith Co., Inc., Westfield, Mass.

ILLINOIS TECH BUILDS NEW HEATING PLANT

Plans of the Illinois Institute of Technology, Chicago, call for completion of a $675,000 heating plant, newest structure in the institute's $15 million development program, by the fall of this year, it has been announced by President Henry T. Heald. It will eventually serve the entire 100 acre southside campus.

The plant building will be 61 ft by 56 ft. Its 63 ft height will be dwarfed by a massive stack immediately south of it, 19 ft in diameter at the bottom and rising 200 ft in the sky with a top diameter of 7 ft.

In line with the north-south dimension of the plant and south of the stack will be a brick-walled coal yard 230 ft by 55 ft.

Exterior of the plant will be buff face brick to conform to the other new campus buildings designed by Ludwig Mies van der Rohe, distinguished architect who heads Illinois Tech's department of architecture.

The north wall will be tile or block construction to permit easy extension and eventual installation of two more boilers.

Initially, the steam distribution system will tie in with the present heating plant. Later the present plant will be used only as a standby.

A practical feature of the heating system will be a double loop tunnel, with the inner loop supplying educational and research buildings and the outer loop furnishing heat for the campus housing units. Heat may be fed in either direction on either loop, thereby obviating a shutdown in the event of a break at any point in the system.

QUESTION OF THE MONTH

YOU ARE invited to submit a heating, piping, or air conditioning question for publication here. You are also invited to submit answers to previously-published questions from others. Those published are paid for at regular rates. Address the Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2, Ill.

Here Are Suggestions for Ventilating Club Kitchen

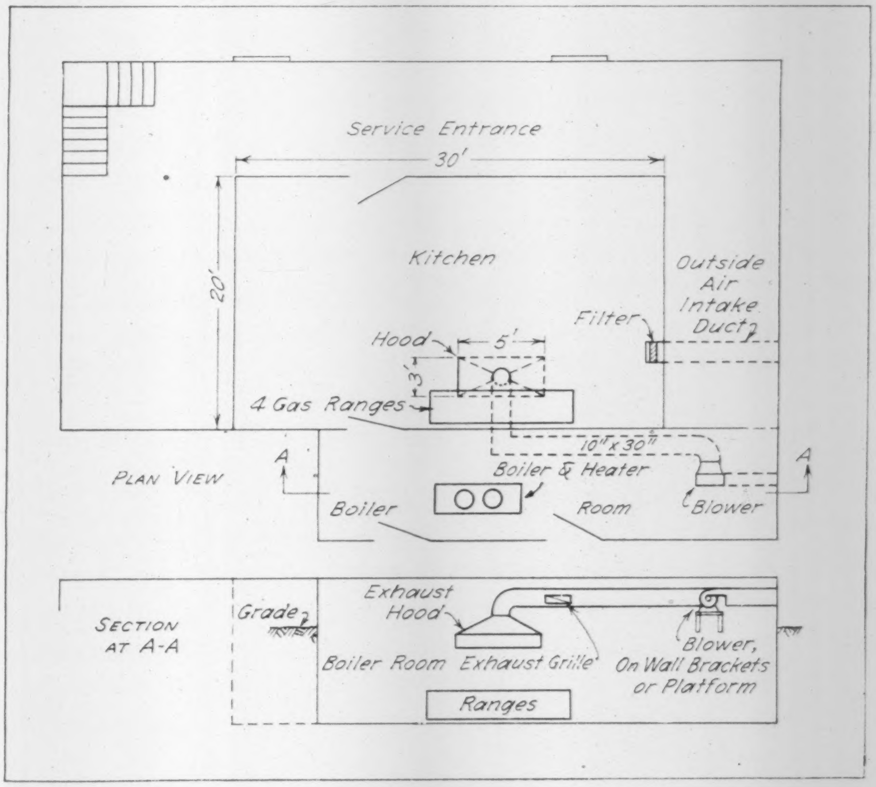
Concerned with the problem of doing something to improve the ventilation in a kitchen for a country club, "W.O."—a heating and air conditioning contractor—asked in the November HPAC for comment from readers on his proposed scheme, and for helpful suggestions. A number of readers have prepared answers; some of them are presented here

REFERRING TO "W.O." 's question on ventilation of a club kitchen, a more desirable environment for the chef could be provided by taking the high temperature air out of the kitchen. The hood over the ranges could be connected to an exhaust fan, and the warm air drawn through a duct and delivered outdoors. The duct could extend from the hood through the boiler room partition and run along the boiler room wall.

An exhaust grille could be installed in the boiler room part of the duct and some of the warm air from the room taken out through it. As for the outside air, to replace that exhausted, an outdoor air intake could be installed from the outside wall through the areaway and terminating in the kitchen. If the outdoor air is not very clean this air should enter the kitchen through a filter as shown in my sketch. Of course, this outdoor air might be introduced at some other location if found more desirable.

I believe it would be prudent to design for 30 air changes per hour, which quantity however might not be necessary. For this air quantity, and also allowing for a portion of the boiler room air to be exhausted, a blower of 4000 cfm capacity should be adequate. Of this quantity, 1000 cfm would be taken from the boiler room and the remainder

"R.H.R." furnishes this sketch as a suggestion to solve "W.O." 's club kitchen ventilation problem


Service Entrance
30'
Kitchen
20'
Outside Air Intake Duct
Filter
Hood
5'
3'
4 Gas Ranges
10" x 30"
Boiler & Heater
A
A
Plan View
Boiler
Room
Blower
Exhaust Hood
Grade
Section at A-A
Boiler Room
Exhaust Grille
Blower, On Wall Brackets or Platform
Ranges

from the kitchen. The hood area as shown in the sketch should give an air movement of approximately 200 fpm above the hood and the duct size has been designed for 1500 fpm. I believe this installation will be economical and efficient.—R.H.R.

INSTALL VENTILATED CANOPY HOOD

I HAVE READ with interest the question submitted by "W.O." regarding the ventilation of a country club kitchen.

I recently had occasion to act as a consultant on several kitchen ventilation problems. In my opinion, the only proper way to control the heat, fumes, and grease from the kitchen "W.O." is concerned with would be to install a canopy hood and ventilate it to outdoors with a fan capable of handling the required amount of air against the total resistance of the system. The hood should be installed over the ranges just as low as is possible without interfering with the chef; usually, about 6½ ft from the floor is the minimum height. The hood should then extend upward a minimum of 1 ft and preferably 1½ to 2 ft before it is reduced in size. This allows bursts of steam and smoke to be confined until they can be evacuated by the exhaust system.

The outside dimensions of the hood are also very important. The hood should extend out over the ranges the equivalent of 4/10 of the distance between the top of the range and the bottom of the hood. For example, if the hood were 40 in. above the top of the range, the outside of the hood should extend 16 in. beyond the front of the range. The extensions should be the same on each end and in back unless the range is up against a wall or if a baffle can be placed between the hood and the back of the range and ends of the range.

Volume of Air

If these conditions can be met, the volume of air to be exhausted can be calculated at the rate of 100 cfm per sq ft of hood area. If the hood cannot be built upward with the space recommended or if the hood is open on four sides, such as would be the case if the ranges were in the center of the kitchen, then at least 150 cfm per sq ft should be figured. If there were to be strong cross drafts, then as high as 200 cfm per sq ft of hood area would be required.

I strongly recommend the installation of filters in the hood to stop the grease from getting inside of the hood, ductwork, and fan. If this happens there is not only a fire hazard but an increase in the cost of operation since there must be regular cleaning if the system is to operate satisfactorily.

Arrangements must be made for air to come into the kitchen; otherwise, the fan cannot exhaust the required amount of air. I prefer to see a large amount of this air come through the diningroom if possible, since this will insure the elimination of all food odors as well as any excess humidity which might be found in the diningroom. It is entirely possible that the kitchen in question is in a climate where heating is not a problem and in this case it would be simple to provide air to the kitchen. However, I wish to add a word of warning concerning the thought of forcing air into the kitchen as this invariably disrupts the exhaust hood and causes grease to be forced throughout the kitchen, increasing the discomfort as well as the cleaning.

In conclusion, I would strongly recommend the reading of chapter 46 in the ASHVE's 1948 Heating, Ventilating, Air Conditioning Guide on Exhausting and Conveying Systems, with special reference to the section entitled Kitchen Hoods on page 834.—K.R.

Printer Poses Perplexing Problem in Psychrometry

Here's an interesting—perhaps a disturbing—letter from an executive of a printing company. Whether he's right or not doesn't seem to us to be the important thing about his remarks. What does seem important is that here is a potential user of air conditioning who, at least for the present, has decided not to go ahead with his plans. We think it would be valuable to air conditioning engineers, contractors, and others in the air conditioning industry—and to printing plants and many other users of air conditioning—to discuss the problem in these columns.

You are invited to comment on the points raised by "D.S." Suitable comment will be published, and paid for at regular rates (with additional payment for sketches). Address The Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

Here are "D.S.'s" remarks:

"We have decided temporarily that the air conditioning industry today does not have exactly what we want—or perhaps it is that they have it but we can't find it.

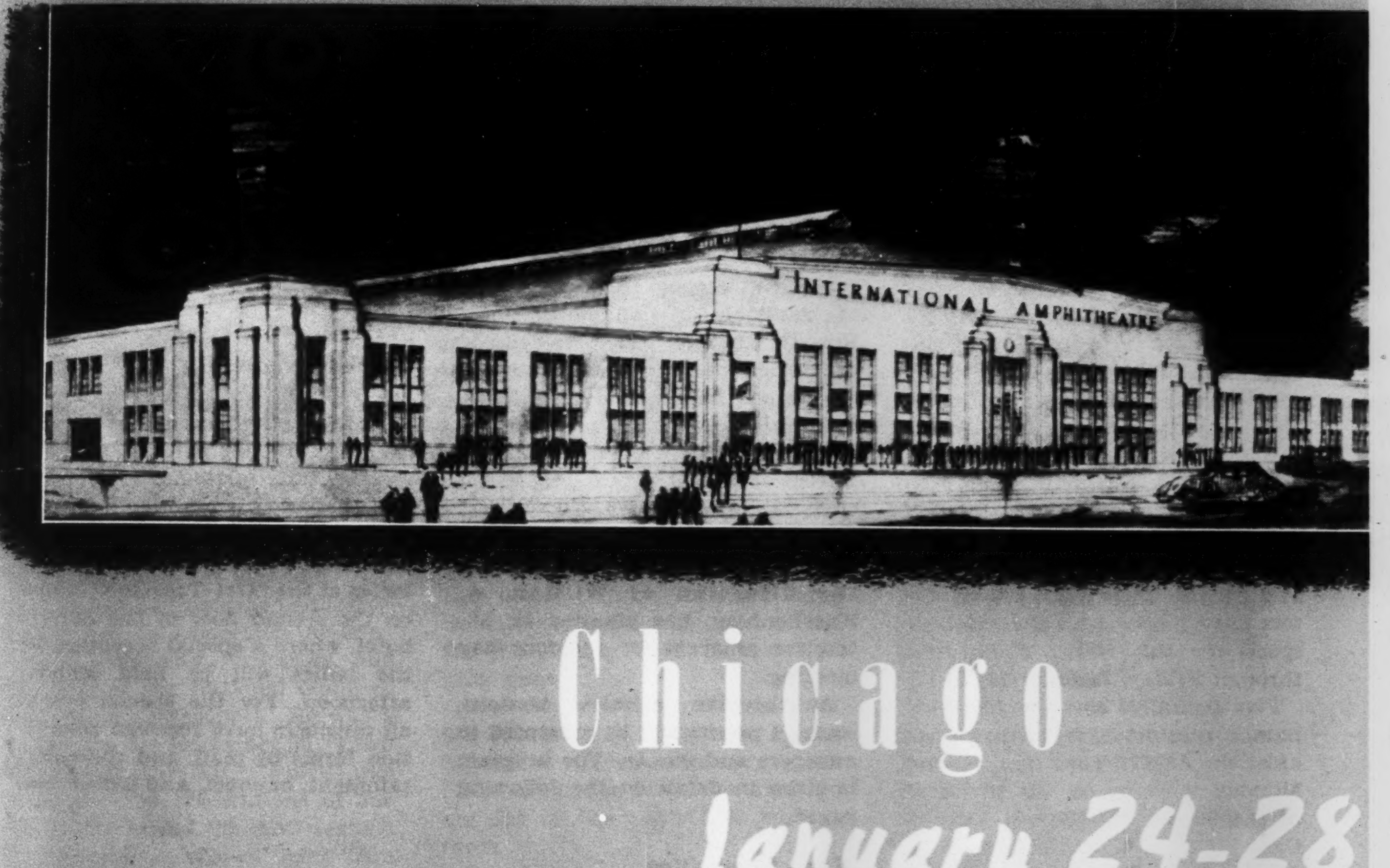
"We are looking for an air conditioning system that has a moderate amount of air change, humidity control, and temperature reduction. Someone who has the time should make some sort of a survey. I recently came back from a convention of the National Association of Photo Lithographers. We had a speaker on air conditioning. The findings that I came away with from all this was that if you had an unlimited amount of money to spend for a super deluxe system with tolerances unnecessarily close, it could be had. But for the ordinary printer, such as ourselves, who has perhaps 10 to 25 bad days a year at which time the humidity actually injures our production, they don't have any intermediate systems to offer—only the finest.

"At present we are using two air conditioning units in our camera room. We have no other system in our entire 70,000 ft of floor space.

"We believe that a humidity and temperature control with a reduction of 10 to 20 deg is sufficient. Lithographic prints can be made very nicely in a humidity of 60 to 65 percent in our opinion. You do not have to spend extra thousands of dollars for 42 percent. Of course, I want to say again that this is our reaction to the information available to us.

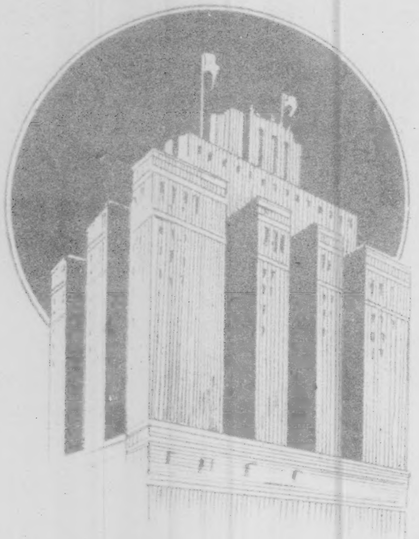
"I wonder whether any of your readers are interested enough to take off a little time and trade thoughts on this subject. For instance, there are lithographers that claim you cannot get along without air conditioning and yet there are lithographers who run 70 in. large sheet presses without any air conditioning and only have trouble, as we do, about 10 to 25 days out of the year."—D.S.

SHOW Section...


INTERNATIONAL AMPHITHEATRE

Chicago January 24-28

Air Conditioning Exposition—Ninth International Heating & Ventilating Exposition. . . . 55th Annual Meeting of the American Society of Heating and Ventilating Engineers.



Human Comfort Featured at 55th ASHVE Meeting and 9th Exposition

The 55th annual meeting of the American Society of Heating and Ventilating Engineers opens in Chicago on Monday, January 24, and will adjourn at noon on Thursday, January 27. Preliminary meetings of committees and the council are scheduled for the preceding Saturday and Sunday. Meeting headquarters will be at the Stevens hotel.

This meeting is held simultaneously with the Air Conditioning Exposition—the Ninth International Heating & Ventilating Exposition, at the International Amphitheater, which opens Monday, January 24, at 2:00 p.m. More than 300 exhibitors have reserved all the available space for this show, which runs through Friday, January 28.

Five technical sessions featuring human comfort have been planned after the ASHVE meeting is opened Monday morning by the president of the Society, Prof. G. L. Tuve of Case Institute of Technology. Among the subjects to be discussed at the sessions are environmental conditions, fuels, industrial ventilation, air distribution, and radiant heating. Reports will also be made on the extensive research carried on at the Society's laboratory in Cleveland and at cooperating universities.

Varied Program Scheduled

Special speakers include Dr. Henry T. Heald, president of the Illinois Institute of Technology, who will speak at the welcome luncheon for both the men and the ladies on Monday, and Cyril Tasker, ASHVE director of research, who will be heard at Tuesday's luncheon; he will report his observations of research in England. John Howatt, Chicago, past-president of the society, will be toastmaster at the annual banquet on Wednesday evening, at which Dr. Clark G. Kuebler, president of Ripon college, will speak.

The Illinois chapter will be host for the meeting and the chapter's committee on arrangements, under the direction of William A. Kuechenberg, has planned an attractive program for the four day meeting.

At the five technical sessions, some 14 papers will be presented to members and guests. The program is given in detail on the following pages.

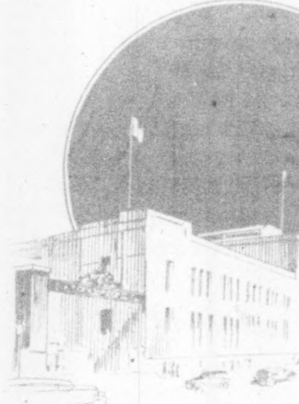
Many Committee Meetings

Committee meetings will begin on Saturday, January 22, and there will be a series of committee conferences on Sunday, Monday, and Tuesday. The daily bulletin board will carry all committee announcements. The chapter delegates will have a get-together on Sunday afternoon and have scheduled two business sessions for Monday afternoon and Tuesday afternoon. The agenda for the meetings has been sent to all delegates and alternates.

Registration will start on Sunday at 1:30 p.m. on the second floor of the Stevens. The first four general sessions will be held in the grand ballroom, and the final session on Thursday will be in the north ballroom.

Special Events Planned

The reception committee, headed by M. W. Bishop, will be ready to receive early arrivals on Sunday, and the ladies committee, of which Mrs. William A. Kuechenberg is chairman, will greet the visiting ladies at the "Get-Together" lounge on the second floor of the Stevens hotel, where a special reception for the ladies will be held Monday afternoon. For the special events, all members have received reservation forms by mail, and the entertainment, banquet, and ladies com-



mittees will appreciate having early reservations for the luncheons, Monday night frolic, the banquet, and the ladies' events.

Of special interest to the ladies will be the luncheon and fashion show in the Marine dining room of the Edgewater Beach hotel on Tuesday. The display of latest town and country fashions will be staged by Kay Morrow with the assistance of the Ray-Vogue School students. Wives and daughters of ASHVE members will be guests of the committee if they register for this affair in advance.

Wednesday will be a big day for the ladies—the "Breakfast Club" broadcast with Don McNeill at the civic opera house at 7:20 a.m., a 9:30 breakfast at the Merchants & Manufacturers club in the Merchandise Mart, and a guided tour of the Mart at 10:30 a.m. Advance registration for the wives and daughters of ASHVE members for these affairs is also essential.

Joseph S. Kearney, chairman of the entertainment committee, promises a good time for everyone attending the Monday night frolic which starts at 9:00 p.m. in the Stevens hotel ballroom, with a fine floor show from 11 to midnight and dancing until 1 o'clock.

Plans are being made by Harvey G. Chapin, Manuel J. Bamond, and their committee for a record breaking banquet on Wednesday evening. The speaker, Dr. Kuebler, will discuss a "Formula for Freedom." Dr. Kuebler is a distinguished educator, member of the American Association of University Professors, and president of the National Guild of Churchmen (Episcopal). He was a speaker on the November 30 "Town Meeting of the Air," which was broadcast over 252 stations of the ABC network and the ABC eastern TV network, the subject being "Are Our Ideals Being Destroyed by the Machine Age?"

Inspection Trips Announced

There will be several inspection trips during the week, registrations for which are being handled by George W. Bornquist's committee. Among them is an inspection of the Ilg Electric Ventilating Co. plant on Tuesday, January 25, leaving the Stevens at 2:30 p.m. and returning to the hotel not later than 5:00 p.m.

There will also be an inspection trip at 2:00 p.m. Tuesday to the Sears, Roebuck & Co. merchandise testing and development laboratories at Spaulding and Arthington Sts. A convenient way to get there from downtown Chicago is via the Garfield Park "el" to the Kedzie station, and then walk four blocks south.

The necessary facilities—including transportation from the Stevens and back to the International Amphitheater—for visits to the Bell & Gossett Co. at Morton Grove will be available on Monday, Tuesday, Wednesday, and Thursday for those who wish to visit this plant.

On Thursday, January 27, there will be a plant inspection trip to McDonnell & Miller, Inc., leaving the Stevens at 1:30 p.m.; there will be facilities during the five days of the exposition for those who cannot make this regular trip to visit this plant.

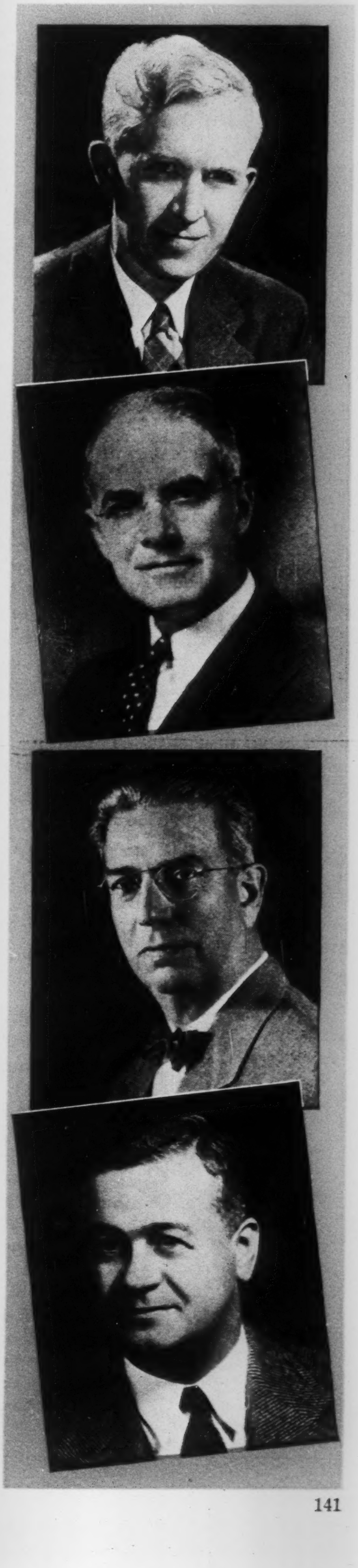
Leading Convention City

More conventions meet in Chicago than in any other city in the world—800 a year, for the city is the industrial, agricultural, and population center of the U. S. More people from more sections of the map can reach the city by more forms of transportation at lower cost than any other city.

A railroad train, for example, arrives at or leaves Chicago every 44 seconds. Its airport is the busiest in the world. Thirty bus lines serve the city. It is a regular port of call for the leading Great Lakes shipping lines.

The city can accommodate 225,000 guests daily in its 1385 hotels. Seventeen thousand of the guest rooms are in the downtown area. So are 600 of the city's 5160 restaurants.

It has famous night clubs, theaters, movies, churches, and concert and opera houses in the heart of town. Chicago's State St. comprises the most notable shopping area in the world. The city has five great auditoriums—Chicago Stadium, Chicago Coliseum, International Amphitheater, Navy Pier, and Soldier Field.



Top to bottom—G. L. Tuve, president of the ASHVE; A. E. Stacey, Jr., first vice president; Lester T. Avery, second vice president; and L. E. Seeley, treasurer

55th Annual Meeting PROGRAM

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

January 24-27 **Stevens Hotel, Chicago**

SATURDAY, JANUARY 22

10:00 a.m.—Committee on Research Meeting and Luncheon—West ballroom

SUNDAY, JANUARY 23

11:00 a.m.—Council Meeting and Luncheon—Private dining room No. 1

1:30 p.m.—Registration—Second floor

2:30 p.m.—Industrial Ventilation Technical Advisory Committee—Room 20

2:30 p.m.—Panel Heating and Cooling TAC (Group A)—Room 21

2:30 p.m.—Panel Heating and Cooling TAC (Group D)—Room 22

4:00 p.m.—Chapter Delegates Meeting—Room 19

7:00 p.m.—Combustion TAC—Room 20

MONDAY, JANUARY 24

8:30 a.m.—Registration—Second floor

9:30 a.m.—Opening Session — Grand ballroom

Greetings

Reports of officers and committees

Report of Committee on Research, by L. N. Hunter, chairman

Physiologic Adjustments of Normal Subjects and Cardiac Patients to Sudden Change in Environment, by Nathaniel Glickman, Tohru Inouye, R. W. Keeton, M.D., I. R. Callen, M.D., Ford K. Hick, M.D., and M. K. Fahnestock

Overall Coefficients for Flat Glass Determined Under Natural Weather Conditions, by George V. Parmelee and Warren W. Aubele

12:15 p.m.—Welcome Luncheon—Grand ballroom

Speaker: Dr. Henry T. Heald, president, Illinois Institute of Technology

1:30 p.m.—Chapter Delegates Meeting—Room 12

2:00 p.m.—Exposition opens at International Amphitheater

2:30 p.m.—Air Cleaning TAC—Room 21

2:30 p.m.—Air Distribution TAC—Room 22

2:30 p.m.—Heat Flow Through Glass TAC—Room 20

2:30 p.m.—Sound Control TAC—Room 13

2:30 p.m.—Heat Pump TAC—Room 19

2:30 p.m.—Guide Publication TAC—Room 10

4:00 p.m.—Reception for ladies — Get-Together lounge, second floor

7:00 p.m.—Cooling Load TAC — Room 20

7:00 p.m.—Panel Heating and Cooling TAC (Group B)—Room 12

7:00 p.m.—Heating Load TAC — Room 22

9:00 p.m.—Informal Party—Grand ballroom

Dancing from 9 to 1, floor show from 11 to 12

TUESDAY, JANUARY 25

9:00 a.m.—Registration—Second floor

9:30 a.m.—Technical Session—Grand ballroom

Report of tellers of election

The Internal Performance of an Induced Draft, Packed Cooling Tower, by N. W. Snyder

Heat Transfer Rates for Refrigerant Boiling in Horizontal Tube Evaporators, by L. G. Seigel, W. L. Bryan, and M. C. Huppert

Psychrometric Factors in the Air Conditioning Estimate, by C. M. Ashley

11:30 a.m.—Buses leave Stevens hotel for luncheon and fashion show for wives and daughters of ASHVE members presented by Kay Morrow and the Ray-Vogue school at Marine dining room of Edgewater Beach hotel

12:30 p.m.—Luncheon Meeting — Grand ballroom

Speaker: Cyril Tasker, director of research, ASHVE

2:00 p.m.—Inspection trip, Sears, Roebuck & Co. merchandise testing and development laboratories

2:30 p.m.—Chapter Delegates—Room 1

2:30 p.m.—Inspection trip, Ilg Electric Ventilating Co. plant

2:30 p.m.—Weather Design Conditions TAC—Room 8

2:30 p.m.—Insulation TAC—Room 9

4:30 p.m.—Committee on Research—Room 10

6:30 p.m.—Past Presidents' Dinner—Room 4

WEDNESDAY, JANUARY 26

7:20 a.m.—Doors close for Breakfast Club radio broadcast at Civic Opera building for wives and daughters of ASHVE members, followed by breakfast at Merchants & Manufacturers club in Merchandise Mart at 9:30 and guided tour of Mart at 10:30

9:00 a.m.—Registration—Second floor

9:30 a.m.—Technical Session — Grand ballroom

Are Automatic Air Shutters Justified on a Gas-Fired Conversion Burner? by W. M. Myler, Jr., and H. W. Nelson

Performance of Fourteen Masonry Chimneys Under Steady State Conditions, by P. R. Achenbach and S. D. Cole

Performance of Residential Chimneys, by L. B. Schmitt and R. B. Engdahl

2:00 p.m.—Technical Session — Grand ballroom

Performance of an Electrical System of Panel Heating With Four Stages of Insulation, by R. J. Lorenzi and J. F. Schreiber

Heating a Basementless House With Radiant Baseboard, by R. H. Weigel and W. S. Harris

Heating Panel Time Response Study, by A. B. Algren and Ben Cicel

7:00 p.m.—Annual banquet — Grand ballroom

Toastmaster: John Howatt, past president, ASHVE

Speaker: Dr. Clark G. Kuebler, president, Ripon College

Subject: Formula for Freedom

THURSDAY, JANUARY 27

9:00 a.m.—Registration — North ballroom

10:00 a.m.—Technical Session — North ballroom

Turbulence in Air Distribution, by H. B. Nottage

Balancing Air Delivery of a System of Manifold Air Diffusers, by G. S. Dauphinee and Peter Argentieri

Air Distribution and Draft, by John Rydberg and Per Norbäck

Unfinished business

New business

Resolutions

Installation of officers

Adjournment

12:30 p.m.—Nominating Committee Luncheon—Room 10

1:00 p.m.—Council Luncheon Meeting—Room 4

1:30 p.m.—Inspection trip, McDonnell & Miller plant

EXPOSITION HOURS

Exposition opens at 2:00 p. m., Monday, January 24, and daily Tuesday through Friday, 12 noon to 10 p.m.

William A. Kuechenberg

James H. Milliken

C. M. Burnam, Jr.

Mrs. Wm. A. Kuechenberg

Harvey G. Chapin

Manuel J. Bamond

Joseph S. Kearney

George W. Bornquist

Peter J. Marschall

Oliver J. Prentice

M. W. Bishop

George V. Zintel

Illinois Chapter Committee Makes Plans

A LARGE AND active Committee on Arrangements for the ASHVE's 55th annual meeting, appointed by the Illinois chapter, has been making plans over a period of many months for the social and entertainment features of the "big week" in Chicago. The members of this committee—and the other members of the chapter—will do everything in their power to make the numerous events both pleasant and profitable for all those who attend them.

The membership of the arrangements committee comprises:

General Chairman—William A. Kuechenberg. *Vice Chairman*—James H. Milliken. *President, Illinois Chapter*—C. M. Burnam, Jr. *Honorary Chairmen*—Harry M. Hart, E. Vernon Hill, John Howatt, Samuel R. Lewis, A. C. Willard.

Banquet Committee—Harvey G. Chapin, *Chairman*, Manuel J. Bamond, *Co-Chairman*, C. H. Bevington, Charles W. De Land, Harry Himelblau, Wm. G. Hoskins, Charles R. Kuglin, Eugene Mathis, Orville Miller, Jr., Ralph A. Patterson, J. J. Philippi, S. I. Rottmayer, D. B. Scheidecker, John F. Tobin, Mel. J. Stevenson.

Entertainment Committee—Joseph S. Kearney, *Chairman*, W. H. Brackett, A. L. Crump, Matthew J. Fitzgerald, E. P. Heckel, Jr., A. O. May, Lawrence O. Paul, Leo J. Potvin, Chas. E. Price, Earl E. Sundeen, Harvey G. Swart.

Exposition Committee—George W. Bornquist, *Chairman*, Clarence C. Graves, A. Warren Lippitt, Robert V. Mehaffey.

Finance Committee—Peter J. Marschall, *Chairman*, Wm. F. Christmann, Harry E. Clo.

Publicity Committee—Oliver J. Prentice, *Chairman*, W. W. Gothard, Morley M. Hattis, Thomas V. Johnson, Geo. G. Turner.

Ladies' Committee—Mrs. William A. Kuechenberg, *Chairman*, Mrs. Chas. E. Price, *Secretary*, Mrs. Manuel J. Bamond, Mrs. M. W. Bishop, Mrs. George W. Bornquist, Mrs. C. M. Burnam, Jr., Mrs. Harvey G. Chapin, Mrs. Joseph S. Kearney, Mrs. Peter J. Marschall, Mrs. James H. Milliken.

Reception Committee—M. W. Bishop, *Chairman*, A. S. Ammerman, Jr., Harvey E. Anderson, Byron L. Casey, George B. Coffey, Henry J. Couch, Thomas Cranage, Chas. E. Crone, J. F. Cummiskey, E. B. Ericsson, James J. Hayes, Carl W. Johnson, Walter W. Lige, Albert B. Martin, James C. Matchett, James E. McClellan, E. N. McDonnell, Edward M. Mittendorff, Roy O. Nelson, H. J. Prebensen, Walter A. Stahl, Arthur G. Stout, Nils W. Swanson, M. J. Van Weelden.

Sessions Committee—George V. Zintel, *Chairman*, Russell H. Burgess, John H. Clarke, G. Gill Freyder, Harry G. Gragg, Herbert Kreisman, James W. Muessig, Roy W. Shields, Roland M. Spencer, Louis H. Streb, Conrad M. Vreuls, Vernon L. Wesby.

New Equipment, New Ideas Offered at Big Exposition

Opens 2 P.M. Monday January 24,
12 Noon to 10 P.M. Tuesday-Friday

Opening its doors at 2:00 p.m., Monday, January 24, and from 12 noon to 10 p.m. Tuesday through Friday thereafter, the Ninth Air Conditioning Exposition—International Heating & Ventilating Exposition at Chicago's International Amphitheater will be crammed with the displays of some 300 manufacturers and will feature many new items of air conditioning, heating, and ventilating equipment and many new ideas on their use and application. Admission will be by invitation and registration only, the general public being excluded.

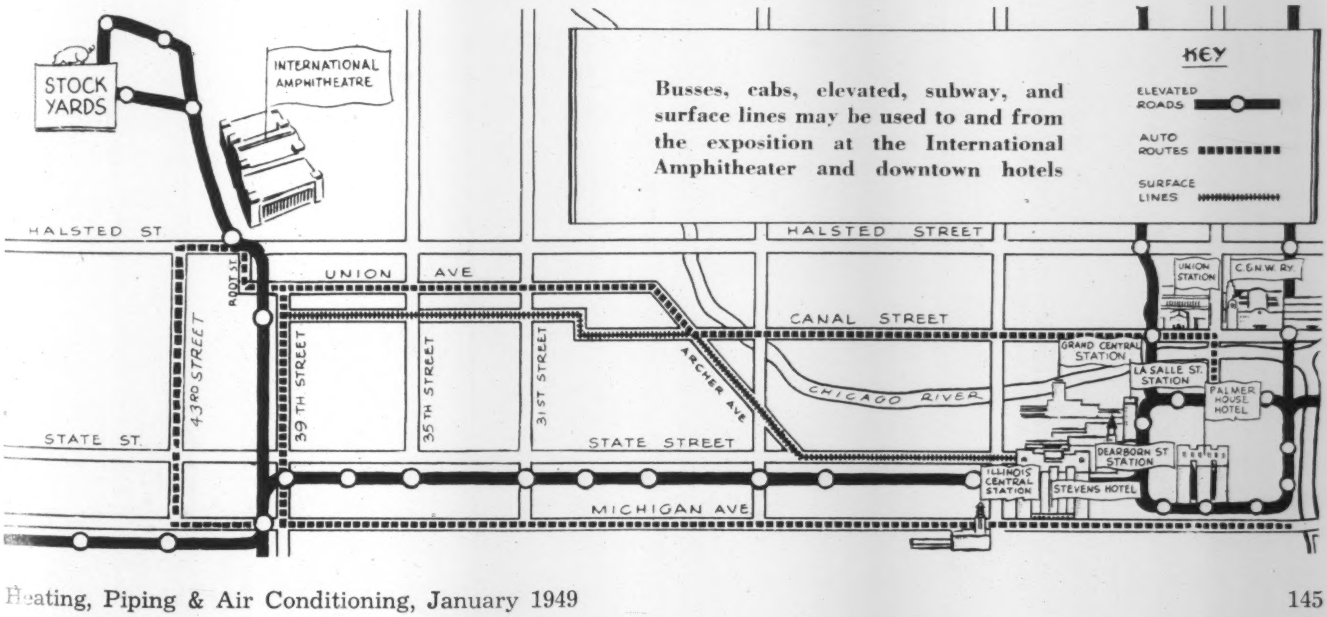
Plans have been made to provide special shuttle bus transportation at a nominal charge between the downtown hotels and the amphitheater. In addition, the city's regular transportation facilities may be used, as indicated on the map.

Purpose of the exposition—which is sponsored by the American Society of Heating and Ventilating Engineers and which is under the management of the International Exposition Co., of which Charles F. Roth is president—is to promote the sciences and arts associated with the design of heating, ventilating and air conditioning systems by disseminating technical information concerning the scope and application of the latest inventions and equipment developments.

NINTH
Air Conditioning
Exposition
INTERNATIONAL HEATING & VENTILATING EXPOSITION
INTERNATIONAL AMPHITHEATRE, CHICAGO
JANUARY 24-28 1949

The exposition is being held during the week of the ASHVE's 55th annual meeting at the Stevens hotel in Chicago, and the program for the meeting has been so arranged as to leave ample time for visiting the displays.

On the following pages will be found a large diagram showing the locations of the many exhibits in the amphitheater, and a complete listing of the exhibitors with information on what they plan to show and their representatives who will be in attendance at their booths. This listing has been compiled by HPAC to facilitate your planning your visit to "the big show" to best advantage.



Busses, cabs, elevated, subway, and surface lines may be used to and from the exposition at the International Amphitheater and downtown hotels

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UNION STATION
C.&N.W. RY.
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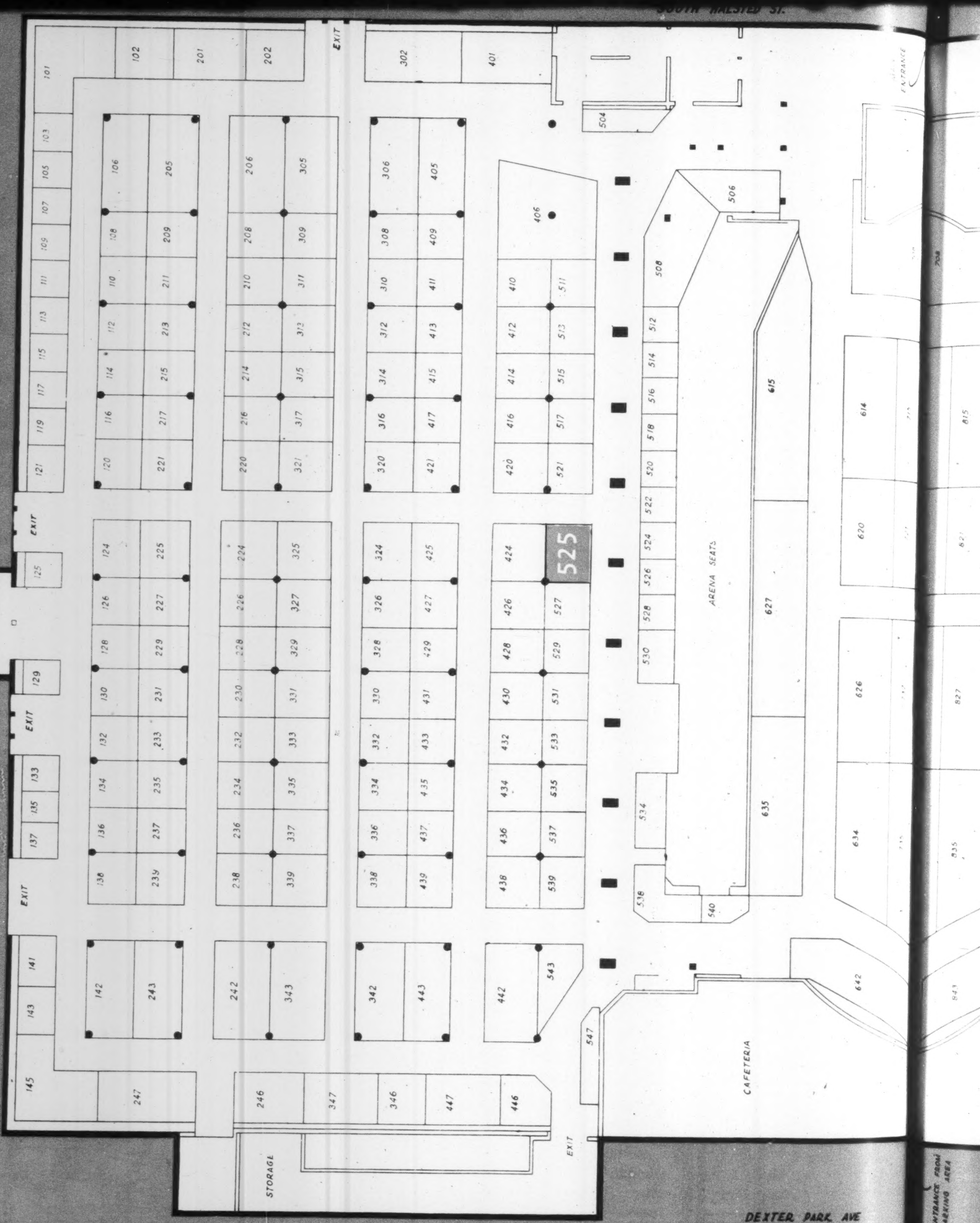
LA SALLE ST. STATION
PALMER HOUSE HOTEL
DEARBORN ST STATION
ILLINOIS CENTRAL STATION
STEVENS HOTEL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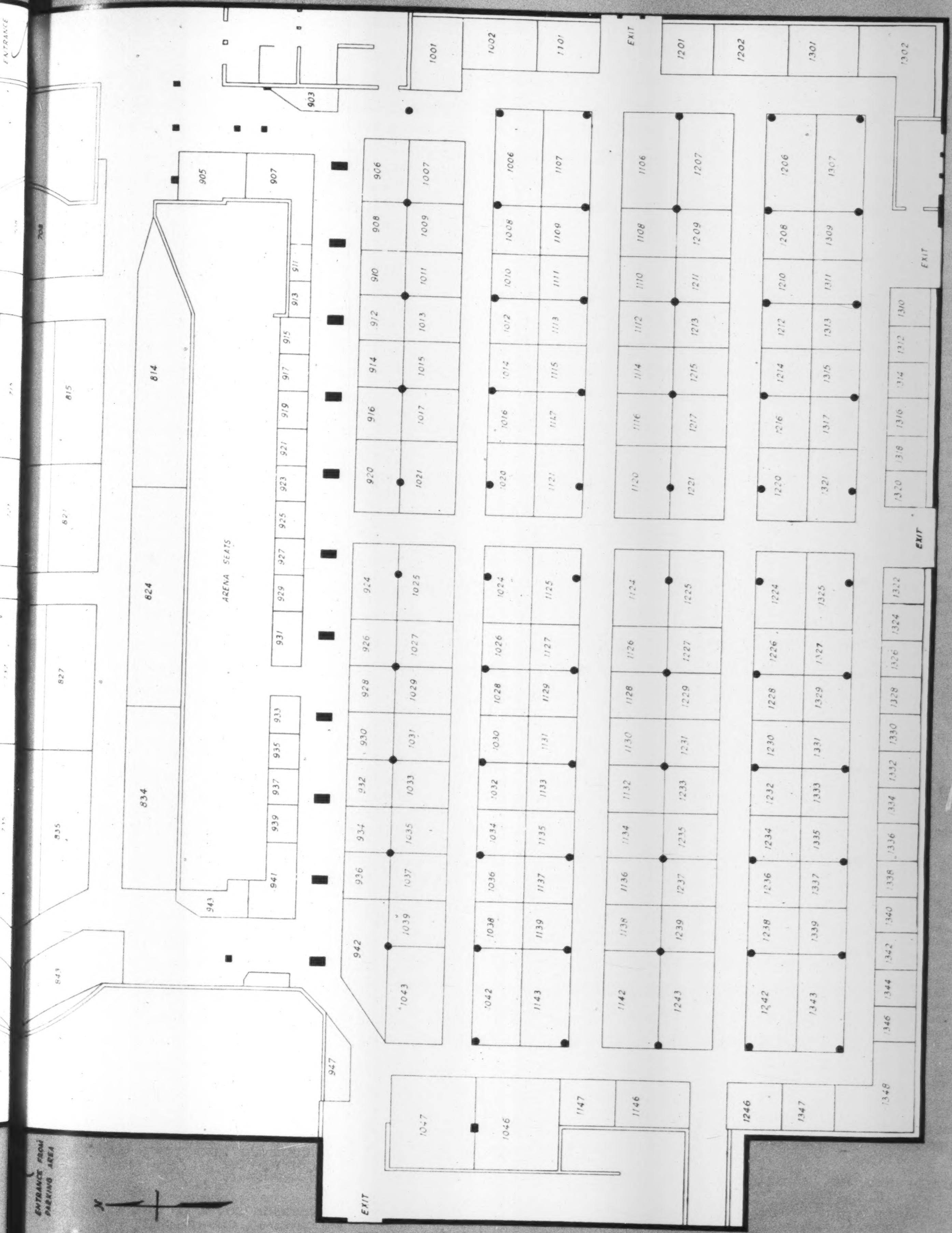
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ENTRANCE FROM PARKING AREA
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at International Amphitheater

EXPOSITION EXHIBITORS AND THEIR EXHIBIT

HERE are the names of the exhibitors who are scheduled for the Ninth Air Conditioning Exposition—the International Heating & Ventilating Exposition, per latest advice at press time from the exposition management. Those listed with information on the products they will exhibit and the names of representatives who will be in attendance furnished these details direct to Heating, Piping & Air Conditioning. With the booth numbers and the accompanying diagram of the exhibit hall on the preceding pages, the location of each exhibitor can be quickly spotted.

The exposition is under the management of the International Exposition Co., Charles F. Roth, Manager, E. K. Stevens, associate manager.

ACE ENGINEERING CO., 1435 W. 15th St., Chicago 8, Ill.—Booth 321.

In attendance: I. L. Schurman, J. W. Cowan, R. W. Bardach, Jr., Lloyd Garrett.

Exhibiting: Horizontal rotary oil burners for industrial and commercial installation, utilizing either No. 5 or No. 6 oil, and featuring new modulating type "Uniflow" oil valve for viscosity compensation, variable vaned air nozzle to control primary air direction, and prefabricated dead front type steel electric panelboard incorporating all control wiring.

ACME EQUIPMENT CO., 205 E. Broadway, Muskogee, Okla.—Booth 126.

In attendance: Curt Buddrus, Hoy Bohannon, A. E. Whitney, Morris Caves, John Burritcher.

Exhibiting: Ventilating, exhaust, and attic fans, axial flow fans, direct fired heaters.

ACME INDUSTRIES, INC., Jackson, Mich.—Booth 620.

In attendance: K. A. Weatherwax, J. T. Maloney, E. B. Dunphy, F. H. Oertel, J. F. Pearson, Wallace Severance, G. L. Baldwin, D. G. Merrill, G. D. Baldwin, H. W. Smith, W. E. Lloyd, Ben Paller, L. T. Russo.

Exhibiting: New hot-dip galvanized evaporative condenser, new "Blo-Cold" industrial unit cooler, "Freon" oil separators, heat exchangers, shell and coil condensers, shell and tube condensers.

AEROFIN CORP., 410 S. Geddes St., Syracuse 1, N. Y.—Booth 1317.

AIR CONDITIONING & OIL HEAT, 232 Madison Ave., New York 16, N. Y.—Booth 1146.

Exhibiting: Publication.

AIR CONTROL PRODUCTS, INC., Coopersville, Mich.—Booths 933-935.

In attendance: D. Stoll, W. Clark, C. Denton, K. Babcock.

Exhibiting: Air conditioning registers and grilles; gravity side wall and baseboard registers; floor registers and floor faces; stack head dampers; ceiling diffusers; floor and ceiling ventilators; attic and roof ventilators. Ceiling diffusers, new pushbutton control registers, new balanced damper gravity register, and new "Uni-Grid" construction floor register will be featured.

AIR CONTROLS, INC., 2310 Superior Ave., Cleveland 14, Ohio—Booths 124-225.

In attendance: B. G. Krause, J. A. Brainard, G. L. Schwarz, O. A. Harris, P. R. Jett.

Exhibiting: Furnace blowers, blower filter units, propeller fans, attic fans, window fans.

AIR DEVICES, INC., 17 E. 42nd St., New York 17, N. Y.—Booth 843.

In attendance: George J. Sweeney, C. N. O'Day, T. A. Hughes, C. A. Eades.

Exhibiting: "Agitair" air filters, high velocity, permanent, cleanable; grease filters; air diffusers—square, rectangular, and circular; exhausters, wind actuated; and featuring new "Agitair" draftless air diffuser, square or rectangular in shape, made in sizes to conform to standard ceiling tile dimensions and especially suited for use in ceilings employing acoustical tile as it blends in with continuous troffer lighting.

AIR FILTER CORP., 108 N. Water St., Milwaukee 2, Wis.—Booth 1342.

In attendance: Rodger J. Clark, Ray J. Schneiberg, Ray J. Breckheimer, George E. Joyce, Theodore Oser.

Exhibiting: "Aircor" air and grease filters.

AIR-MAZE CORP., 5200 Harvard Ave., Cleveland 5, Ohio—Booth 141.

In attendance: W. B. Watterson, F. P. Purvis, N. L. Lamprecht, A. L. Crump.

Exhibiting: Air filters.

AIR-O-CEL CO., 22000 Woodward Ave., Detroit 20, Mich.—Booth 1211.

In attendance: Floyd C. Reinke, Ernest F. Dahm, Allen R. Oberson, Heiman Winkelman.

Exhibiting: Vapor barrier insulating board, reflective and asphalted, particularly adapted for winter and summer use.

AIRTEMP DIV.—see **CHRYSLER CORP.**

AIRTHERM MFG. CO., 700 S. Spring Ave., St. Louis 10, Mo.—Booth 1121.

In attendance: F. P. Kohlbry, N. B. Barsha, W. C. Brandau, Mrs. T. Bronemeier, B. L. Renderer, Ray O. Reeves, J. C. Watkins.

Exhibiting: Convector radiators, propeller and blower fan type steam unit heaters, oil and gas fired industrial warm air heaters.

ALDRICH CO., Wyoming, Ill.—Booth 243.

In attendance: P. M. Stephenson, Barney Mulder, E. L. Fox.

Exhibiting: Oil burners, oil fired boiler-burner units, gas fired boiler-burner units, featuring model SAX oil burner and series "B" oil and gas fired boilers.

AMERICAN AIR FILTER CO., INC., 373 Central Ave., Louisville 8, Ky.—Booths 302-401.

In attendance: J. H. Milliken, Carl F. Larsson, Howard W. Pound, Harry J. Noles, John R. McConnell, James W. May, Harry E. Clo, Henry J. Couch, Harry G. Gragg.

Exhibiting: "Electro-PL" electronic air filter employing paper as filtering media; "Electro-Airmat" electronic air filter employing paper as filtering media; "Electro-Cell" electronic air filter, plate type; "Electro-Matic" electronic air filter, completely automatic; "Multi-Duty" automatic air filter; "PL-24" mechanical unit filter using paper as filtering media; unit filters, permanent renewable; unit filters, replaceable. The new "Electro-PL," an electronic air filter with an intermediate cleaning efficiency "for applications where the efficiency of a mechanical filter is too low and that of an electronic precipitator is unnecessarily high," will be featured. Tyndall beam "Electro-Airmat" demonstrator which removes particles of smoke from the air will be demonstrated.

AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 525.

In attendance: Frank P. Keeney, Chas. E. Price, Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler, Frank Kottra, John E. Peterson, John McCullough.

Exhibiting: American Artisan technical books, market data.

AMERICAN GAS ASSOCIATION, 420 Lexington Ave., New York 17, N. Y.—Booths 1232-1234.

In attendance: Clifford E. Hall.

Exhibiting: Display telling industry story of future of gas heating, with information on increased natural and manufactured gas capacity.

AMERICAN HYDROVAC INC., 286 Scholes St., Brooklyn 6, N. Y.—Booth 1340.

In attendance: Robert G. Pitz, Robert M. Pitz, Louis Soltanoff, Paul Emery.

Exhibiting: Condensation pumps, vacuum heating return pumps.

AMERICAN RADIATOR & STANDARD SANITARY CORP., P. O. Box 1226, Pittsburgh 30, Pa.—Booth 708.

In attendance: H. L. Spindler, D. D. Couch, H. C. Day, W. G. Senft, Joseph Salamone, R. F. L'Hote, D. J. Quinn, H. R. Trout, N. L. Maczkov, C. T. Woodroof, R. H. Porter, Pinkney Varble, J. Hart, W. Hastie, J. Mammoser, R. Craven, W. Krugman, C. Hornby, C. Crothers, J. Hart, W. Hastie.

Exhibiting: "Empire" gas boiler for hot water, "Severn" coal burning boiler, baseboard radiant panels, "Winterglo" oil unit, "Sunrad" radiator, "Multifin" convector, "Oakmont" oil burning boiler, "Wyandotte" gas fired winter air conditioner, "Budget" water heater, "Arlington Square" hand fired coal steel furnace, "Chippewa" winter air conditioner.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, 51 Madison Ave., New York 10, N. Y.—Booth 903.

AMERICAN STEEL & WIRE CO.—see **UNITED STATES STEEL CORP.**

AMERICAN THERMAL INDUSTRIES, INC., 440 Illinois Ave., Detroit 1, Mich.—Booth 1301.

In attendance: E. Feinberg, John J. Kramer, Harold Muir.

Exhibiting: 3, 5, 7½, 10, and 15 ton packaged air conditioners, featuring service-sealed compressor in all models.

AMES IRON WKS., Oswego, N.Y.—Booth 101.

ANCHOR DIV., STRATTON & TERSTEGGE CO., P.O. Box 311, New Albany, Ind.—Booths 912-914.

ANDERSON CO., V. D., 1935 W. 96th St., Cleveland 2, Ohio—Booth 135.

In attendance: W. J. Gleason, W. P. Nevins, C. L. Carlson, F. L. Winkler.

Exhibiting: Steam traps, air release valves, pipe line strainers.

ANEMOSTAT CORP. OF AMERICA, 10 E. 39th St., New York 16, N. Y.—Booths 1001-1002-1101.

In attendance: August Rust-Oppenheim, F. J. Kurth, J. B. Hewett, L. R. Phillips, V. Floyd Self, H. G. Junger, R. F. Hayes, J. W. Molitor, F. Honerkamp.

Exhibiting: Ceiling air diffuser, wall air diffuser, "Universal C-1" adjustable air diffuser, "Anemotherm" air meter.

APRIL SHOWERS CO., INC., 4126 Eighth St,. N. W., Washington 11, D. C.—Booth 119.

In attendance: M. Bigelow MacPherson, Daniel Wright, Leonard H. Holder, William Gray, J. E. Leininger, Mr. Cross.

Exhibiting: Patented roof cooling and roof preservation system, new "Asco" spray heads for utilizing waste water from air conditioning, new self-cleaning residence spray head.

ARMSTRONG FURNACE CO., 851 W. Third Ave., Columbus 12, Ohio—Booths 311-313-315.

In attendance: W. S. Moellering, Kenneth Rhoton, Albert Russell, Robert Hoehl.

Exhibiting: Round gravity coal furnace, coal fired winter air conditioner, gas "Hi-Boy," oil fired winter air conditioner, oil fired vaporizing type "Hi-Boy," conversion oil burner.

ARMSTRONG MACHINE WKS., 816 Maple St., Three Rivers, Mich.—Booths 915-917.

In attendance: O. E. Ulrich, Sr., O. E. Ulrich, Jr., T. H. Rea, T. M. Reed, A. E. Armstrong, L. F. Armstrong.

Exhibiting: Steam traps unit steam humidifiers, strainers, air vent traps, temperature controls, and featuring new temperature controls for hot water heating systems. A glass model of a trap, operating at 7 lb. pressure, will show how the trap handles air and dirt as well as condensate.

AUER REGISTER CO., 3608 Payne Ave., Cleveland 14, Ohio—Booth 230.

In attendance: G. R. Metzger, H. F. Curtis, W. H. Tonner.

Exhibiting: Warm air and air conditioning registers and grilles, ornamental grilles, new style metal clothes-chute doors.

AUSTIN HEATING SERVICE, 21 Henderson St., Everett 49, Mass.—Booths 107-109-111.

AU-TEMP-CO CORP., 521 Fifth Ave., New York 17, N. Y.—Booth 908.

In attendance: Arthur R. Herske, Albert Fowler.

Exhibiting: Electronic indoor-outdoor heating controls, motorized valves.

AUTOMATIC DEVICES CO., 53 W. Jackson Blvd., Chicago 4, Ill.—Booth 504.

In attendance: H. T. Kucera, H. Recher, O. W. Dobson, G. T. Reynertson.

Exhibiting: "Weather-Man" automatic thermostat control for regulating heating of buildings from outdoor temperatures which changes the time heating starts each morning, the time of shut down each evening, and the rate of heating during the day automatically as outdoor temperatures change. Special feature will be the "Weather-Cron," a new day-night time clock that will, when installed outdoors and when used with any ordinary thermostat, automatically change the time of shift from the day setting to the night setting and from the night setting to the day setting as the outdoor weather changes; it also eliminates heating at outside temperatures above 65 deg. and maintains daytime settings of the thermostat both night as well as day when outdoor temperatures drop to an extreme low.

AUTOMATIC PRODUCTS CO., 2450 N. 32nd St., Milwaukee 10, Wis.—Booths 413-415.

In attendance: R. W. Johnson, E. A. Vallee, J. F. Cowan, D. G. Tmey, F. J. Marshall, A. L. Neva, B. T. Carroll, R E. Petersen, S. Burghduff, L. V. McCarty, J. Rice, V. R. Pawelsky, D. Moerick, A. A. Schubert, R. W. Sloane, R. A. Simpson, A. L. Topp, E. Rack.

Exhibiting: Refrigeration—automatic and thermostatic expansion valves, suction pressure regulating valves, driers and filters, water and refrigerant solenoid valves, water regulating valves, refrigerant check valves. Oil—Constant level valves for space or water heaters and furnaces, tobacco curing oil control valves, fuel oil line filters, "Oilifter" fuel pumps, range and oven controls, fuel line solenoid valves, thermostats. Gas—Solenoid valves. Solid Fuel—Heat regulator sets, damper motors. New products include air conditioning expansion valves, water regulating valve, high capacity suction pressure regulating valve, "Gasapack" for space or water heaters and for furnaces, electric automatic pilot, gas heating thermostats, complete packaged control system, and hydraulic operated furnace tender for solid fuel.

AVERY FARM MACHINERY CO., INC.—see HART HEAT DIV.

BACHARACH INDUSTRIAL INSTRUMENT CO., 7000 Bennett St., Pittsburgh 8, Pa.—Booth 1322.

BAHNSON CO., 1001 S. Marshall St., Winston-Salem, N. C.—Booth 102.

In attendance: Robert M. Anderson, F. Boxall, L. E. Horton.

Exhibiting: Central station air conditioning system, "Humiduct" unit air conditioning system, unit humidifiers, atomizers, humidity controls, and featuring type DC air washer nozzle which requires considerably less power in pump requirements for central station air conditioning systems, and self cleaning air washer nozzles.

BALTIMORE AIRCOIL CO., INC., 715 W. Pratt St., Baltimore 1, Md.—Booth 412.

In attendance: John Engalitcheff, Jr., Ray F. Forseille.

Exhibiting: Model U evaporative condenser, including 115 and 125 ton units; model J cooling tower, introducing 3 and 5 ton outdoor forced draft cooling towers.

BARBER-COLMAN CO., 229 Loomis St., Rockford, Ill.—Booth 1343.

BARNES & JONES, INC., 128 Brookside Ave., Jamaica Plain 30, Mass.—Booth 417.

In attendance: Walter E. Barnes, Carl W. Larson.

Exhibiting: Vacuum and vapor heating specialties, steam heating control equipment.

BAUER & BLACK, DIV. OF KENDALL CO., Industrial Adhesive Tape Dept., 222 W. Adams St., Chicago 6, Ill.—Booth 1112.

In attendance: George C. Stineback, Wm. D. Seymour, Wm. J. Miller, E. J. Tooke, D. E. Skogstrom.

Exhibiting: "Fiberglas" industrial adhesive tape products and devices fabricated with these products, featuring flexible duct connector and industrial adhesive tape No. 290 for pipe and duct sealing and insulation stripping.

BEARLEE PRODUCTS CO., 1255 S. Monroe, Green Bay, Wis.—Booth 921.

In attendance: B. E. Colburn, W. S. Brede, Emmett Duemke.

Exhibiting: Fuel oil tank gages and vent caps, and featuring 55 gal barrel gages for use with lubricating oils, alcohol, kerosene, etc. for barrels sitting in an upright position where the contents are removed with a hand pump.

BELL & GOSSETT CO., 8200 N. Austin Ave., Morton Grove, Ill.—Booth 626.

In attendance: E. J. Gossett, R. E. Moore, C. E. Pullum, R. A. Patterson, Frank C. Hackett, Wm. Boone, Chester Towns, Joseph Flasch, Wm. Warner.

Exhibiting: Hot water heating specialties—boosters, flow control valves, "Airtrol" system, compression tank, relief valves, "Monoflo" fittings, indirect water heaters, motorized valves, etc. Industrial equipment—refrigeration components, condensers, evaporators, liquid receivers, centrifugal pumps, fuel oil heaters.

BEVERLY SHEAR MFG. CO., 3004 W. 111th St., Chicago 43, Ill.—Booth 328.

In attendance: Kurt W. Nebel, R. J. Nebel, George K. Nebel, Frances M. Nebel, Alice Arkell, Stanley Kalish, Robert L. Christensen.

Exhibiting: Throatless shears for cutting metal (straight, irregular, or circular); slitting shears (straight cutting); floor stands.

BORG-WARNER CORP.—see NORGE HEAT DIV.

BREUER ELECTRIC MFG. CO., 5100 N. Ravenswood Ave., Chicago 40, Ill.—Booths 1313-1315.

In attendance: G. W. Breuer, A. M. Anderson, J. C. O'Connell, P. M. Williams, I. W. Strasburger.

Exhibiting: Heavy duty industrial vacuum cleaners, portable electric blowers, floor machines.

BRUNDAGE CO., 512 N. Park St., Kalamazoo 11, Mich.—Booth 443.

In attendance: H. F. Brundage, F. W. Brundage, W. A. Rockafield, J. E. Brundage, F. R. Bishop, Lou Reining, E. J. Busch, H. J. Kirkendall, J. S. Babush, H. Perkinson, H. W. Winningham, B. F. McLouth, E. N. Moncrief, Irving Dane, R. J. Milholland, Paul Simmons, N. E. Hill.

Exhibiting: Furnace blowers, blower-filter units.

BRYANT HEATER CO., 17825 St. Clair Ave., Cleveland, Ohio—Booth 1243.

BUFFALO FORGE CO., 490 Broadway, Buffalo 5, N. Y.—Booths 216-220.

In attendance: E. F. Wendt, C. A. Booth, C. C. Cheyney, F. B. Stubinger, W. R. Heath, R. D. Madison, R. T. Thornton, E. J. Gill, P. B. Campbell, W. Holt, R. P. Warren, L. D. Emmert, S. Trumbo, E. P. Heckel, Jr., J. W. Gibbs, H. L. Moore, R. E. Sherman, T. A. Weager, W. E. Hutton, J. W. Cooper, E. F. Bell.

Exhibiting: Type LL ventilating fans, "Highboy" unit heaters, model F comfort conditioning cabinet, 5 ton evaporative condenser, vaneaxial belt-driven fan, HVA fan, belted vent set, type AW industrial exhauster. The "Highboy" heater, model F condition cabinet, HVA fan, and belted vent set are all new models; various other items have modifications which are new.

BUILDERS-PROVIDENCE, INC., 9 Codding St., Providence 1, R. I.—Booth 117.

In attendance: F. W. Deutsch, H. D. Bugg, G. E. Riepe, W. Lengyel, L. E. Harper.

Exhibiting: "Shuntflo" totalizing flow meters for steam, air, or gas, and "Propeloflo" main line water meters.

BUNDY TUBING CO., 8109 E. Jefferson Ave., Detroit 12, Mich.—Booth 1339.

BURNHAM CORP., BOILER DIV., 2 Main St., Irvington, N. Y.—Booths 436-438.

In attendance: V. A. Good, F. R. Brophy, D. W. Stevens, R. P. Henderson, J. F. Orr, E. A. Snyder, B. A. Chreiman.

Exhibiting: "Base-Ray" radiant baseboards, standard and "Hy-Power" models; "Yello-Jacket" boiler; and featuring "Pacemaker" oil burner and gas boiler.

CARNEGIE-ILLINOIS STEEL CORP.—see **UNITED STATES STEEL CORP.**

CARRIER CORP., 300 S. Geddes St., Syracuse 1, N. Y.—Booth 734.

In attendance: A. P. Shanklin, C. U. Spriggs, O. W. Bynum, G. T. Long, A. E. Meling, M. E. Mooney, W. S. Bodinus, A. K. Snyder, P. K. Ray, J. P. Patterson, V. S. Day, O. E. Gammill.

Exhibiting: Refrigerating machines, "Weathermakers," and unit heaters, featuring new model "46 U" unit heater.

CATSKILL METAL WORKS, INC., Catskill, N. Y.—Booths 923-925.

In attendance: T. L. Seaman, G. M. Seaman, Ed Gardner, Frank T. Fitt, James McCauley, Ernest Karbe.

Exhibiting: Anthracite stokers, high pressure conversion oil burners, steel water tube heating boiler, conversion gas burners, boiler-burner units, circulators.

CENTRAL STATES STEEL BOILER CO., 4649 W. Harrison St., Chicago 44, Ill.—Booth 540.

In attendance: R. M. Sokoloff, A. M. Sokoloff, W. F. O'Connell.

Exhibiting: Sectional low pressure boiler that is erected in the boiler room within a radius of 400 miles from Chicago by a crew from the factory; low pressure unit steel boiler, process of erection for which is accomplished by electrically welding the boiler into one unit.

CENTURY ENGINEERING CORP., 401 Third Ave., S.E., Cedar Rapids, Ia.—Booth 726.

In attendance: E. J. Lattner, M. D. McWilliams, Keith W. Dunn, R. P. Nessler, Ray F. Considine, H. J. Stites, W. E. Haynes, A. H. Mellott.

Exhibiting: Oil burners, warm air oil fired furnaces, warm air oil fired "Hi-boy," hot water boiler-burner unit, oil fired hot water heater. Cushion-cradled oil burner with heavy neoprene mounting to absorb vibration and noise, "Lo-Hi-Boy" unit especially engineered and adapted for utility room use, and "Midget Powerhouse" hot water boiler unit will be featured.

CHACE CO., W. M., 1600 Beard Ave., Detroit, Mich.—Booth 234.

CHAR-GALE MFG. CO., 4325 Hiawatha Ave., Minneapolis, Minn.—Booth 939.

In attendance: L. C. Johnston, C. L. Johnston, Nick J. Dovolis, D. O. Jacobson.

Exhibiting: Aluminum air conditioning fittings; aluminum gravity fittings; air conditioning registers, grilles, and gravity registers, and featuring humidifier.

CHELSEA FAN & BLOWER CO., INC., 1206 Grove St., Irvington 11, N. J.—Booths 1028-1030.

In attendance: William J. Lohman, Jr., George J. Read, A. L. Glick, A. R. Jaques, D. P. Welsher.

Exhibiting: Complete line of ventilating and exhaust fans, featuring new and improved designs of window fans for homes, apartments, stores, offices, etc.

CHICAGO BLOWER CORP., 4558 W. Congress St., Chicago 24, Ill.—Booth 547.

In attendance: F. H. Gohl, J. J. Homan, T. J. Grace.

Exhibiting: Steel plate exhausters, multiblade exhausters, turbo pressure blowers, propeller fans, axial air flow fans, ventilating sets, welding fume exhausters. Both the axial airfoil propeller fans (which provide adjustable blade pitch) and the ventilating sets are new developments. The ventilating sets can be furnished in both belt driven and direct connected and are suitable for commercial and industrial applications.

CHICAGO PUMP CO., 2300 Wolfram St., Chicago 18, Ill.—Booth 1021.

CHRYSLER CORP., AIRTEMP DIV., 1600 Webster St., Dayton 1, Ohio—Booth 814.

In attendance: C. S. Stackpole, V. P. Black, W. B. Shirley, A. F. Ward, M. T. Bard.

Exhibiting: Air conditioning, domestic heating, and commercial refrigeration products.

CINCO WINDOW DIV.—see **RUSSELL CO., F. C.**

CLARAGE FAN CO., Kalamazoo, Mich.—Booths 1208-1210.

In attendance: T. C. Cranage, C. O. Fury, J. W. Muessig, W. E. Harryman.

Exhibiting: Capillary air washer, "Vortex" control, water-jacketed bearing, induced draft wheel, small fans.

CLAYTON & LAMBERT MFG. CO., 1701 Dixie Highway, Louisville 10, Ky.—Booth 1348.

CLIMAX MACHINERY CO., 301 S. La Salle St., Indianapolis, Ind.—Booths 1328-1330.

In attendance: H. C. Thomas, M. H. Fuller, Wm. B. Francis, Wm. J. Campbell.

Exhibiting: Attic fans, exhaust room and house coolers, and featuring complete new line of evaporative coolers.

COLE-SEWELL ENGINEERING CO., 2288 University Ave., St. Paul 4, Minn.—Booth 1013.

In attendance: H. J. Sewell, E. W. Laudert, S. H. Burt, I. E. Loring.

Exhibiting: Draft governors, draft "Korektors".

COLEMAN CO., INC., 250 N. St. Francis, Wichita 1, Kan.—Booths 1124-1126.

In attendance: Dean Olds, Shirley Campbell, Jack Kice, L. L. Songer, Ed Johnson, Wilbur Youle, W. W. Boyce, F. W. Richards, H. W. Morton.

Exhibiting: Gas, oil, and LP gas floor furnaces; oil, gas, and LP gas space heaters; oil warm air furnaces; oil, gas, and LP gas water heaters.

COLUMBIA STEEL CO.—see **UNITED STATES STEEL CORP.**

COMBUSTION CONTROL CORP., 77 Broadway, Cambridge 42, Mass.—Booth 414.

In attendance: John A. Long, Burton E. Shaw, L. D. Sibley, Henry Christiansen, Ralph B. Lundy.

Exhibiting: Modern flame failure safeguards, programming controls, and smoke alarms and indicators for all types of industrial oil and gas burners.

COMBUSTIONEER DIV.—see **STEEL PRODUCTS ENGINEERING CO.**

COMFORT PRODUCTS CORP., 2220 S. Lamesa, Dallas 2, Tex.—Booth 326.

In attendance: B. J. Spitzka, Joseph V. Mariner, Jr.

Exhibiting: 3500 cfm "Comfort" air washer in operation, with plexiglass sides in order that visitors may observe complete operation of water distribution and evaporative area; [illegible] cfm residential type evaporative cooler, requiring but 8 in. from top to bottom of conventional window and employing new, improved fiber glass filter pads; 1600 cfm type window model evaporative cooler in walnut grain and pastel shades. The evaporative coolers will be displayed in steel window frames, complete with venetian blinds.

COMMERCIAL FILTERS CORP., 18 Third St., Boston 27, Mass.—Booth 421.

In attendance: E. W. Sherburne, F. I. Tourt[illegible], J. L. Tourtelot, T. J. Roche, R. Ludem[illegible], L. Wilson, K. B. Stone.

Exhibiting: Filters for gravity and pressure type oil burners; filters for bulk delivery service by oil companies, railroads, etc. for filtration of heating oils, diesel fuels, etc., and featuring new designs.

CONCO ENGINEERING WKS., Mendota, Ill.—Booth 142.

In attendance: Walter Sormane, J. B. Walton, L. N. Beardsley, R. W. McKenzie.

Exhibiting: Coal, oil and gas fired furnaces and boilers; oil burners; coal stokers; and water heaters. Models VF, TF, GF 100,000 Btu conditioner, oil or gas fired; and model VU, GU 70,000 Btu conditioner, oil or gas fired, will be featured.

CONDENSATION ENGINEERING CORP., 122 S. Michigan Ave., Chicago 3, Ill.—Booth 514.

In attendance: B. A. Johnson, Wayne Limbert, Walt Aschliman, Tom Jones, George Thompson.

Exhibiting: "Vitroliner" type E flue (packaged chimney), chimney lining pipe.

CONKEY & CO., H. D.—see **FIELD CONTROL DIV.**

CONNOR ENGINEERING CORP., W. B., 114 E. 32nd St., New York 16, N. Y.—Booths 427-429.

In attendance: H. A. Baker, J. H. Bartol, H. T. Porter, H. Sleik, T. L. Smith.

Exhibiting: "Dorex" activated carbon air purification and air recovery equipment; "Kno-Draft" adjustable ceiling air diffusers and accessories; featuring type L hospital bed odor control unit.

CONTINENTAL AIR FILTERS, INC., 2520 Helm St., Louisville, Ky.—Booth 932.

In attendance: Wm. K. Gregory, A. S. Lewis Jr.

Exhibiting: Automatic self cleaning air filter; and featuring all metal filter cells for capillary air washers.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.—Booth 735.

In attendance: W. D. Howard, C. A. Stauber, W. G. Kehm, G. E. Hoffman, W. Anderson, H. Luzak, L. Clasby, H. J. Wulf, G. G. Lindholm, H. H. Stift.

Exhibiting: Boilers No. 14, 16, 20, 30, 40, and 2WG4, with the No. 16 connected to a piping hookup; representative line of valves and fittings; simulated livingroom and powder room with radiant baseboard panel heating in operation. The radiant baseboard and the No. 30 boiler are new designs.

CROTTY MFG. CORP., 133-15 35th Ave., Flushing, N. Y.—Booth 930.

In attendance: Michael C. Crotty, Ralph J. Sibilla.

Exhibiting: Steel domestic boiler and new boiler-burner unit.

CURTIS REFRIGERATING MCH. DIV. OF CURTIS MFG. CO., 1905 Kienlen Ave., St.

Louis 20, Mo.—Booths 224-226-228-325-327-329.

In attendance: H. C. Morrison, H. J. Nettler, L. P. Gilbert, C. W. Stover, K. T. Rockey, G. W. Schultz, W. M. Summerell, N. H. Behrend, M. C. Jones, R. A. Loughman, R. A. Vogt, G. C. Helde, T. M. Garrettson, H. A. Peyser.

Exhibiting: 5 ton packaged air conditioning unit; 10 ton central type air conditioning unit with automatic capacity reduction; remote condensing units for air conditioning. New 3 and 5 ton condensing units for use with warm air home heating, and automatic capacity reduction device, will be featured.

DELAVAN ENGINEERING CO., 414 Twelfth St., Des Moines, Ia.—Booths 516-518.

In attendance: Nelson B. Delavan, Eugene O. Olson, H. L. McNally.

Exhibiting: "Delavan-Balloffet" design oil burner nozzles and accessories, oil burner serviceman's kit, and inspection mirrors, and featuring "Adaptraps" (anti-drip adapter) and sludge solvent.

DODGE CORP., F. W., 119 W. 40th St., New York 18, N. Y.—Booths 231-233.

Exhibiting: Publications and services.

DOLE VALVE CO., 1933 Carroll Ave., Chicago 12, Ill.—Booths 424-426.

In attendance: Henry A. Aronson, Willis G. Pennington, William Wallin, J. F. Lund.

Exhibiting: Air and vacuum valve, and water mixer. New thermostatic air control (automatic register), and new "No. 20" fully automatic hot water air valve will be featured.

DOLLINGER CORP., 11 Centre Park, Rochester 3, N. Y.—Booth 316.

In attendance: W. F. Dollinger, Jr., L. L. Dollinger, Jr.

Exhibiting: Air and liquid filters.

DOMESTIC ENGINEERING, 1900 Prairie Ave., Chicago 16, Ill.—Booth 1042.

Exhibiting: Publication.

DOWAGIAC STEEL FURNACE CO., Beeson St., Dowagiac, Mich.—Booths 431-433.

In attendance: L. W. Silverthorn, G. D. Woodhouse, A. W. Wick, F. N. Parker.

Exhibiting: Coal, oil, and gas fired heating equipment.

DOYLE VACUUM CLEANER CO., 225 Stevens St. S.W., Grand Rapids 2, Mich.—Booths 1344-1346.

In attendance: Dewey I. Doyle, Dewey I. Doyle, Jr., Harry W. Taylor, Patrick E. Doyle, Stanley C. Knapp, Harry F. Arnold, Clifford O. Boyce, Ralph W. Hauenstein.

Exhibiting: "De Luxe" and standard "Grand Rapids" furnace cleaner and attachments, including "Y-Branch" boiler flue cleaning attachment and accessories. A sales plan, "Merchandise through the Service Department" will be explained. New "Vac-It Quick Change" attachments, which enable the operator to change from one attachment to another quickly, will be featured.

DRAVO CORP., Dravo Bldg., Fifth and Liberty Aves., Pittsburgh 22, Pa.—Booth 1242.

In attendance: D. R. Berg, H. A. Pietsch, F. S. Lappin, R. M. Barnes, J. R. Kinkaid, R. Hedges, T. M. Fallon, A. A. Kosarin, T. W. Eshbach, W. L. Davidson, George Heard.

Exhibiting: "Counterflo" heater for comfort heating, year 'round ventilating, process drying, tempering makeup air, heat curing.

DREIS & KRUMP MFG. CO., 7400 S. Loomis Blvd., Chicago 36, Ill.—Booth 242.

In attendance: J. I. Andersen, Jack Byrnes, John Kutscheid, John McNulty, T. E. Kelleher, W. H. Dreis, J. A. Schaefer.

Exhibiting: Hand brakes, folders, and press brakes.

DUNHAM CO., C. A., 400 W. Madison, Chicago 6, Ill.—Booths 308-310-312-314.

In attendance: O. J. Prentice, F. E. Schmidt, L. D. Mandell, E. F. Ford, W. S. Browning, E. G. Powell, Albert Hesmer, D. B. Stockdale, B. H. Jarvis, J. W. Jungels, W. M. Stephens, Paul R. Schaffer, Mr. Striebel.

Exhibiting: Baseboard radiation; finned radiation; convectors; unit heaters; vacuum, condensation, and centrifugal pumps; complete line of steam heating specialties; "Vari-Vac" differential system and control equipment.

DUO-THERM DIV., MOTOR WHEEL CORP., Lansing 3, Mich.—Booths 145-247.

In attendance: M. F. Cotes, R. H. Reeder, E. M. Crary, Karl Egeler, Adolph Frantz, D. F. Jones, B. F. Burkholz, J. K. Nelson, R. C. Finney.

Exhibiting: Automatic fuel oil furnaces, automatic fuel oil burning water heaters, automatic gas water heaters, automatic fuel oil space heaters.

DWYER MFG. CO., F. W., 317 S. Western Ave., Chicago 12, Ill—Booth 437.

In attendance: J. G. Dwyer, F. W. Dwyer.

Exhibiting: Combustion test sets, draft gages, manometers, pitot tubes.

ECKHART MFG. CO., 470 First Ave. W., Roselle, N. J.—Booths 1027-1029.

In attendance: Arnold Eckhart, Sr., Arnold Eckhart, Jr., Fred H. Horne.

Exhibiting: Oil burner and boiler-burner units, featuring model SR-C burner equipped with "Cat-comb-spiralator" which is a catalytic combustion monitor head which "will effect a saving of at least 33 1/3 percent in fuel."

EMERSON ELECTRIC MFG. CO., 8100 Florissant Ave., St. Louis 21, Mo.—Booth 1017.

In attendance: J. D. Waterbury, T. J. Egan, F. C. Weaver.

Exhibiting: Power motors, exhaust fans, attic fans, kitchen ventilators, air circulators.

EMPIRE STOVE CO., Belleville, Ill.—Booth 943.

FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.—Booth 714.

FARR CO., 2615 Southwest Dr., Los Angeles 43, Calif.—Booth 538.

In attendance: R. S. Farr, W. H. Welty, H. J. Kennedy, M. S. Farr, F. X. Shea.

Exhibitors: "Far-Air" air filters, and featuring the new self-washing filter unit.

FASCO INDUSTRIES, INC., P.O. Box 509, Rochester 2, N. Y.—Booth 1220.

FEDDERS-QUIGAN CORP., 57 Tonawanda St., Buffalo 7, N. Y.—Booths 524-526.

In attendance: C. W. Little, E. R. Walker, G. M. Meyer, N. Downey, R. W. Morgan, L. Sahs, E. W. Friend, A. G. Trometer, W. E. Zielonka.

Exhibiting: Unit heaters, and featuring convectors.

FEDERAL BOILER CO., INC., Granite & West Sts., Midland Park, N. J.—Booth 906.

FIELD CONTROL DIV., H. D. CONKEY & CO., Mendota, Ill.—Booth 1221.

In attendance: C. W. Potter, R. A. Friestad, James Burch, Russell Glass, Fay Kinne, Mark Achison, Wayne Davis, Howard Waff, Paul Jett, Fred McGee, Frank Lenihan.

Exhibiting: "Scotty" barometric draft controls, safety controls, fuel saving systems.

FIRELINE STOVE & FURNACE LINING CO., 1800 Kingsbury St., Chicago 17, Ill.—Booth 936.

FITZGIBBONS BOILER CO., INC., 101 Park Ave., New York 17, N. Y.—Booth 634.

In attendance: Paul K. Addams, Ray C. Malvin, G. E. Olsen, J. R. Collette, G. Nelligann.

Exhibiting: "400" series boiler; "80" series boiler; DM-42 boiler; 80 DA "Directaire."

FOREST CITY FOUNDRIES CO.—See NIAGARA FURNACE DIV.

FRICK CO., W. Main St., Waynesboro, Pa.—Booth 202.

In attendance: W. H. Aubrey, C. C. Smith, M. W. Garland, W. O. Kline, R. M. Shuford, P. H. Buch, V. J. Sparks, A. E. Roebke, J. A. Etter, P. A. Willis.

Exhibiting: Refrigerating and air conditioning equipment, featuring "New Eclipse" compressors in several sizes—one with the moving parts cut away and operated in slow motion.

FRIGIDAIRE DIV., GENERAL MOTORS CORP., Dayton 1, Ohio—Booth 737.

In attendance: W. F. Switzer, C. F. Wood, Fred E. Lehman, R. Woodward, E. J. Boyer, Harold E. Martin.

Exhibiting: New ½ ton window type room conditioner and 5 ton store conditioner, both equipped with transparent windows and with interiors lighted to show mechanism; new remote floor type air conditioning unit for homes and offices hooked up with a reciprocating compressor to illustrate how such an installation is made; large 9 ton central system air conditioner, representative of an extensive line with capacities ranging from 5 to 40 tons; representative long and short series "Multipath" cooling units; operating cutaway 3 gal capacity bottle type water cooler.

FUELOIL & OIL HEAT, 232 Madison Ave., New York 16, N. Y.—Booth 1146.

Exhibiting: Publication.

GENERAL BLOWER CO., Ferris Ave., Morton Grove, Ill.—Booth 1207.

In attendance: Wm. W. Meyer, J. E. Clark, H. R. Johnston, J. K. Shadek, G. F. Spooner, S. C. Tarnoff.

Exhibiting: Blowers, fans, and exhausters, and new furnace cleaner.

GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, Calif.—Booth 1107.

In attendance: Jack F. Ray, E. B. Maire, W. A. Ray, Fred E. Weldon, W. F. Marsh, C. G. McCarthy, R. C. Boehm, Mel Lewis, Glen Zear, B. L. Lerch, Herb Lindstrom, A. E. Hess, R. C. Allen, Jr., O. D. Shaddox, Geo. A. LeFevre, Carl C. Tischler, W. L. Kell, W. R. Nason.

Exhibiting: Automatic temperature, pressure, level, and flow controls, featuring new pressure and temperature controls, new gas safety controls, new expansion valves for refrigeration, and new industrial controls.

GENERAL ELECTRIC CO., Apparatus Dept., 1 River Rd., Schenectady 5, N. Y.—Booth 1025.

Exhibiting: Motors, both fractional and integral horsepower; control units, heating devices, transformers.

GENERAL ENGINEERING & MFG. CO., 4417 Oleatha Ave., St. Louis 16, Mo.—Booths 1132-1134-1136-1138.

In attendance: N. B. Schreiber, F. A. Deniston, J. Y. Hewitt, R. D. Elgin, James Lamb, O. Greenwood, A. E. Cullen, R. M. Skinner, Roland V. Vizgird, H. B. Osmundsen.

Exhibiting: "Gemco" packaged air conditioning unit, "Miracula" heat pump.

GENERAL FILTERS, INC., 12890 Westwood Ave., Detroit 23, Mich.—Booth 103.

In attendance: Arthur D. Redner, Mrs. Grace Redner, Robert G. Gregory, William B. Forrest, L. E. Schulein, Gene Granse, Bill Granse, T. C. French, Paul R. Jett.

Exhibiting: Fuel oil filters.

GENERAL FITTINGS CO., 123 Georgia Ave., Providence 5, R. I.—Booth 347.

In attendance: W. S. Moffitt, J. J. Cotter, C. A. Maine, R. F. Hull, A. A. Redderson, Irwin Sanders, H. F. Horton.

Exhibiting: Industrial instantaneous heaters, indirect and tankless water heaters, thermostatic mixing valves, converters, heat exchangers, other heating specialties, and pipe unions, and featuring "Cady" automatic electric water heaters and copper tube solder type fittings.

GENERAL MOTORS CORP.—see FRIGIDAIRE DIV.

GENERAL PLATE DIV.—see METALS & CONTROLS CORP.

GREENLEE TOOL CO., 2136 Twelfth St., Rockford, Ill.—Booths 1309-1311.

In attendance: Ray Samuelson, Adolph Hawkinson, Jack Edwards, P. E. Chappel, Roy Pearson, Charles Reed, Frank Fleming, Darwin Martinson.

Exhibiting: Pipe benders; tubing benders; conduit benders; pipe set boring tools; plumbers' bits; auger bits; car bits; ship augers; chisels; gouges, draw knives; bit extensions; expansive bits; spiral screw driver; knockout punches and cutters. New No. 1440 set of pipe tools which bore holes in wood for pipe sizes either by hand or with an electric drill will be featured, and No. 770-R bender for radiant heating will be demonstrated making 90 and 180 deg bends.

GRINNELL CO., INC., 260 W. Exchange St., Providence 1, R. I.—Booth 201.

In attendance: C. L. McGinnis, A. F. Van Eck, D. A. Johnson.

Exhibiting: Pipe fittings, welding fittings, unit heaters, pipe hangers, unions, "Grinnell-Saunders" diaphragm valves, spring hangers, constant-support hangers prefabricated piping. New textile "Thermolier," a unit heater for textile and allied fields, will be featured.

HAMMOND BRASS WORKS, Hammond, Ind. Booth 1215.

HARRIS & CO., ARTHUR, 212 N. Aberdeen St., Chicago 7, Ill.—Booth 332.

In attendance: G. C. Harris, A. H. Elliott.

Exhibiting: Copper, steel, and stainless steel floats.

HART HEAT DIV., 2006 S. Washington St., Peoria 2, Ill.—Booth 1337.

In attendance: M. J. Murray, W. Z. Bishop, C. E. Owen, Joseph Dropsey.

Exhibiting: Winter air conditioners, oil fired and gas fired; oil fired boilers, oil burners; new packaged oil fired "Hy-Boy"; full line of new oil fired furnaces.

HART & COOLEY MFG. CO., 500 E. Eighth St., Holland, Mich.—Booth 425.

In attendance: George Heeringa, R. W. Blanchard, Fred Heads, J. B. Jones, Al Rowder, Howard Eddy, John H. Van Dyke, John Lucas.

Exhibiting: Registers and grilles for air conditioning and warm air systems, and furnace accessories; "No. 75" design register with turning blade valve will be featured, and simple application of the "Kwik-Way" damper regulator set will be demonstrated.

HEATING, PIPING & AIR CONDITIONING, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 525.

In attendance: Frank P. Keeney, Chas. E. Price, Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler, Frank Kottra, C. M. Burnam, Jr., Thomas V. Johnson.

Exhibiting: Heating, Piping & Air Conditioning; technical books; market data.

HEAT-TIMER CORP., 160 Fifth Ave., New York 10, N. Y.—Booth 330.

HEATING & VENTILATING, 148 Lafayette St., New York 13, N. Y.—Booths 537-539.

Exhibiting: Publication.

HENRY FURNACE CO., Medina, Ohio—Booths 1024-1026, 1125-1127.

In attendance: Edward P. Hayes, M. H. Klett, James Crombie, E. R. Downe, C. L. Grandstaff, W. H. Olsen, R. H. Olsen.

Exhibiting: Gravity furnaces and air conditioning units, steel and cast iron construction, for coal, gas, and oil; furnace pipe, fittings, and prefabricated ducts; "Mayn" air dampers. Featured will be new 1949 models of oil, gun type, air conditioning units; oil, vaporizing units, air conditioning and gravity; gas units, air conditioning and gravity; coal units, air conditioning and gravity, with square casings.

HOFFMAN SPECIALTY CO., 1001 York St., Indianapolis 7, Ind.—Booths 1032-1034.

In attendance: Neil D. Skinner, E. L. Malm, F. H. Gaylord, W. W. Dillon, L. J. Potvin, H. Sanford.

Exhibiting: Hot water control systems, venting valves, thermostatic traps, supply valves, float and thermostatic traps, inverted bucket traps, pressure reducing valves, temperature regulators, vacuum and condensation pumps, and demonstrating new "Panelmatic" controls for panel heating.

HOLCOMB & HOKE MFG. CO., 1545 Van Buren St., Indianapolis, Ind.—Booths 1336-1338.

In attendance: Frank J. Hoke, Harry E. Blasingham, Harry R. Blasingham, Bowman Downey, Howard Caldwell, Ralph Monson.

Exhibiting: "Silent Breeze" attic ventilator horizontally mounted fan package, attic ventilator vertically mounted, 24 in. window ventilator to fit common 28 in. windows, 24 in. room circulator, basement dehumidifier, barn ventilator, designed especially for dairy barns, to reduce winter condensation and increase summer ventilation.

HOMEASE PRODUCTS CO., 52 Iowa Ave., Paterson 3, N. J.—Booth 941.

In attendance: Robert Birkins, Edward P. Schinman.

Exhibiting: Oil burners.

HOOK & ACKERMAN, INC., 18 E. 41st St., New York 17, N. Y.—Booth 1226.

In attendance: Emory C. Perry, John F. Baier, Harold S. Ackerman, Wm. F. Hosmer.

Exhibiting: "Hydrotherm" gas fired boilers for all type of gases in capacity range from 72,000 to 252,000 Btu input, for residential use and for volume hot water heating, and "Autotherm" conversion burner for residential use. A combination heating and domestic hot water supply unit for furnishing heat and domestic hot water at two different temperatures, which has been used for the heating of 350 individual apartments for a large garden apartment project in Cleveland, will be featured.

ILG ELECTRIC VENTILATING CO., 2[illegible]50 N. Crawford Ave., Chicago 41, Ill.—Booths 338-439.

In attendance: B. L. Casey, H. J. Lagodzinski, A. DeSmet, A. K. Johnson, C. W. Dexter, D. F. Winter.

Exhibiting: "Q" fans, 63—303 sizes; 1786 unit heaters, 913 electric unit heater, B12 gasoline engine-driven centrifugal fan, PE-11 direct connected centrifugal fan, pressure type B12 volume centrifugal fan, 6SS-ID centrifugal fan, motor operated shutter, 10 in. builtin "Ilgette," 10 in. portable panel type "Ilgette," BC50 direct connected centrifugal fan with variable air control by remote control, featuring the "Q" fans and the exhibitor's self cooled motor.

ILLINOIS ENGINEERING CO., Racine Ave. at 21st St., Chicago 8, Ill.—Booth 1143.

In attendance: Robert L. Gifford, J. C. Matchett, G. L. Harris, J. L. Ehretsman, R. W. Leutwiler, Paul B. Hultgren, L. Bandet, W. A. Loehrl, A. F. Nesbet, Albert Marshall, Glenn Schnagel.

Exhibiting: Vacuum and vapor heating system specialties; selective pressure control system; high pressure specialties—steam traps, pressure reducing valves, stop and check valves; automatic steam and fluid control equipment. Packless radiator valves and motor operated control valves and control cabinets will be featured.

ILLINOIS TESTING LABORATORIES, INC., 420 N. LaSalle St., Chicago 10, Ill.—Booths 911-913.

In attendance: W. J. Bailey, M. D. Carlson, J. J. Kuska, H. A. Lachance, M. J. Rauscher.

Exhibiting: Air velocity measuring instruments ("Velometers"), temperature measuring instruments, and dew point indicators, and featuring low range pyrometer for radiant heating and "Velometer, Jr."

IMPERIAL BRASS MFG. CO., 1200 W. Harrison St., Chicago 7, Ill.—Booth 138.

In attendance: C. H. Benson, A. E. Hallstrom, H. McNellis, R. Cherney, E. F. Todd.

Exhibiting: Refrigeration fittings, LP gas fittings, oil burner fittings, refrigeration valves, refrigeration driers, shutoff valves for LP gas and oil burners, and tube working tools. New No. 300-F "Hi-duty" flaring tool, new No. 274-F "Hi-duty" tube cutter, and new LPG moisture trap will be featured.

INDEPENDENT REGISTER CO., 3747 E. 93rd St., Cleveland, Ohio—Booth 317.

In attendance: K. B. Solberg, B. N. Richardson, A. H. Ullman.

Exhibiting: Registers and grilles for heating, ventilating, and air conditioning.

IRON FIREMAN MFG. CO., 3170 W. 106th St., Cleveland 11, Ohio—Booths 211-213-215-217-221.

In attendance: W. J. O'Neil, Dale Wylie.

Exhibiting: Coal stokers and oil burners (domestic, commercial, and industrial); furnace and boiler units, stoker and oil fired; gas burners and gas furnaces; controls for automatic heating and power equipment.

JACKSON & CHURCH CO., Furnace Div., Saginaw, Mich.—Booth 815.

In attendance: L. S. Redford, W. C. MacDougall, F. C. Adams, C. J. Low, Roy Lanaham, H. W. Winningham, Neil Reisdorph.

C. E. Malone, J. B. Winston, W. L. Troescner, M. N. Johnston, Sam Neide, Henry Nickerson, Frank J. Hughes.

Exhibiting: Warm air winter air conditioning equipment from outputs of 52,500 to 3,800,000 Btu, all types of firing; oil burners, stokers, and gas burners.

JEFFERSON ELECTRIC CO., Bellwood, Ill.—Booth 926.

In attendance: C. T. Harnett.

Exhibiting: Ignition transformers.

JENKINS BROS. INC., 80 White St., New York 13, N. Y.—Booth 306.

JENN AIR PRODUCTS CO., 409 Architects and Builders Bldg., Indianapolis 4, Ind.—Booth 937.

In attendance: Edward Filkins, Louis Jenn, Edward Neiderhofer.

Exhibiting: Wall and roof type exhaust blowers.

JOHNSON SERVICE CO., 507 E. Michigan St., Milwaukee 2, Wis.—Booths 1201-1202.

In attendance: M. M. Herrick, J. J. Philippi, C. A. Storch, J. L. Best, C. H. Henriksen, Henry Seetch.

Exhibiting: Automatic temperature and air conditioning control systems applied to various types of heating, ventilating, and air conditioning installations. Control equipment will be shown in actual, interrelated operation. The heating, ventilating and air conditioning systems to which it is applied will be presented by means of functional dioramas.

JONES & BROWN, INC., 439 Sixth Ave., Pittsburgh 19, Pa.—Booth 1302.

In attendance: Charles Greenleaf, P. M. Hutchins, C. J. Land, Jack Lewis, Harry B. Nabor, C. R. Sieber.

Exhibiting: "Ko-Z-Aire" conditioning units (complete line of gas and oil fired, forced warm air furnaces), "RAC" regulated air circulation control for forced warm air furnaces.

JOY MFG. CO., Henry W. Oliver Bldg., Pittsburgh 22, Pa.—Booths 1108-1110.

In attendance: R. A. Heindel, C. L. Tinker, C. F. Goede, C. R. Browning.

Exhibiting: "Axivane" fans.

KAUSTINE CO., INC., Perry, N. Y.—Booth 905.

In attendance: J. B. Mollnow, Leon Kunicky, Nelson Carney, John B. Mollnow, Jr.

Exhibiting: Oil fired winter air conditioners.

KEENEY PUBLISHING CO., 6 N. Michigan Ave., Chicago 2, Ill.—Booth 525.

In attendance: Frank P. Keeney, Chas. E. Price, Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler, Frank Kottra, C. M. Burnam, Jr., John E. Peterson, Thomas V. Johnson, John McCullough.

Exhibiting: Heating, Piping & Air Conditioning; American Artisan; technical books; market data.

KEHM CORP., 135 S. La Salle St., Chicago, Ill.—Booth 924.

KENDALL CO.—see BAUER & BLACK DIV.

KENT CO., INC., 107 Canal, Rome, N. Y.—Booth 1010.

In attendance: C. E. Clifford, G. C. Carley, Glen Markham.

Exhibiting: Portable, heavy duty double suction furnace and boiler cleaner.

KEWANEE BOILER CORP., Kewanee, Ill.—Booths 416-420.

In attendance: J. M. Hartman, A. B. Martin, Carl Olsen, Ralph Sjoberg, W. E. Foskett, R. E. Wicklander, Edward W. Irwin.

Exhibiting: "Scottie Jr." boiler, riveted portable 9 hp unit built for power and process steam, 100 lb working pressure, available in sizes 6 to 30 hp, all fuels; type C welded boiler for low pressure steam heating, sawed-in-two section of 8500 sq ft size on display, available 2200 to 42,500 sq ft in units or batteries for all fuels, mechanical or hand fired, may be fitted with hot water heating coils, storage tank or tankless types, 55 to 2100 gal; "Square-Heat" type R jacketed boiler 3R3, 1300 sq ft, mechanical fired, 400 gal tank coil installed, 55 to 720 gal available; "Square-Heat" type R unjacketed boiler 3R3, with 420 gal tankless coil installed, 220 to 700 gal available, available in eight sizes, 740 to 3000 sq ft, for medium size buildings; round R steel boiler in square enclosing jacket for heating homes or small buildings, 400 ft No. 1734-MQ shown assembled with controls for oil, gas firing, fitted with tankless coil for 170 gph domestic hot water demand; "Bubbling" boiler in gas fired operation to demonstrate generation of steam through illuminated observation ports.

KRUEGER SENTRY GAUGE CO., 1056 W. Mason St., Green Bay, Wis.—Booths 527-529.

In attendance: W. S. Krueger, M. J. Feifarek, J. F. Wilhelm, I. I. Platsky.

Exhibiting: New "At-A-Glance" remote indication liquid level gages, type A and type B draft controls, type M barrel gages, special gages for stove and space heater tanks.

LAU BLOWER CO., 2007 Home Ave., Dayton 7, Ohio—Booths 116-120.

In attendance: E. B. Lau, T. I. Byrd, E. V. Sullivan, Harold Faulkender, John Burrowes, E. C. Wolford, J. B. Wallace, W. J. Lohrey, O. C. Sommers, B. E. Abney, L. W. Gillespie, C. C. Miley.

Exhibiting: Complete line of warm air furnace and air conditioning blowers, complete line of industrial and residential fans, and accessories—pulley wheels, pillow blocks, etc. New package blower-filter unit, newly designed attic fans, new "Rancher" type attic fan, and new steel pulley wheel will be featured.

LEWIS & CO., INC., JOSEPH E., 1303 Carroll St., Baltimore 30, Md.—Booth 137.

In attendance: William W. Saunders, J. Robert McDonald, John C, Fullerton, Gail E. Cogan.

Exhibiting: "Aqua Heater" insulated tankless water heater.

LIBBEY-OWENS-FORD GLASS CO., Nicholas Bldg., Toledo, Ohio—Booths 235-237.

In attendance: Earl Aiken, J. J. Long.

Exhibiting: "Thermopane."

LINDE AIR PRODUCTS CO., 30 E. 42nd St., New York 17, N. Y.—Booth 246.

In attendance: C. A. Melzarek, J. P. Skinner, E. L. Arnold, C. H. Daugherty, C. B. Dewees, F. Z. Hippler, W. F. Liddell, G. E. Maver, R. A. Near, R. W. Raney, J. C. Savage, M. M. Walker.

Exhibiting: Oxy-acetylene apparatus for cutting, joining, and forming of metals; small cylinders of oxygen and acetylene mounted on compact cylinder trucks which make portable outfits for oxy-acetylene work; complete line of apparatus for air-acetylene heating, soldering, and brazing; actual cutting of metals, soldering, and making of sweat type fittings will be demonstrated in this exhibit; "Heliarc" inert gas-shielded arc welding equipment; welded samples of aluminum, stainless steel, and other "hard-to-weld" metals joined by this process.

LOCKFORMER CO., 4615 W. Roosevelt Rd., Chicago 50, Ill.—Booth 531.

In attendance: George W. Lamberson, Harold G. Flagler, Ed C. Bill, John Davis.

Exhibiting: "Lockformers" Nos. 16, 20, and 24; "Easy Edger" power flanging attachment; and featuring S cleat machine.

MAID-O'-MIST, INC., 3217 N. Pulaski Rd., Chicago 41, Ill.—Booth 1015.

In attendance: Wm. J. Woolley, O. V. Woolley, H. J. Carr, R. W. Thorne, B. Tooker, C. Sweeney, E. W. Busch, Paul Agey, E. E. Berthet, H. T. Waterstraat, Geo. Herman, E. N. Moncrief.

Exhibiting: Automatic humidifiers for steam and hot water radiators and warm air furnaces; spray humidifiers; "Auto-Vent" air eliminators for hot water mains, radiators, convectors, radiant coils, panels, etc.; humidifier valves and accessories; water line control valves; boiler feeders and cutoffs; strainers for water, air, and gas. New line of water feeders and cutoffs for low pressure steam boilers will be featured, and new line of strainers for water, air, and gas lines will be introduced.

MARSH CORP., JAS. P., 3501 Howard St., Skokie, Ill.—Booth 238.

McDONNELL & MILLER, INC., Wrigley Bldg., Chicago 11, Ill.—Booth 942.

In attendance: E. N. McDonnell, Nils W. Swanson, Leo J. Kmiecik, George La Roi, Parker Devlin, James W. Ramsay, Howard Peary, Charles Bottger, Dick Flickinger, Bill Cox.

Exhibiting: Boiler water level controls, including water feeders, low water fuel cutoffs, pump controllers for steam boilers, safety relief valves for hot water heating boilers and domestic hot water tanks, humidifier water level controls for warm air furnaces and for evaporative coolers. New No. 157 water column type high pressure pump control, low water cutoff and low water alarm, and several new flange mounting float operated valves for service on condensate receiver tanks will be featured.

McQUAY, INC., 1600 Broadway N.E., Minneapolis 13, Minn.—Booths 1031-1033-1035.

In attendance: H. Blake Thomas, C. L. Bensen, R. N. Weber, R. S. Stover.

Exhibiting: Steam heating coils; water cooling coils, direct expansion coils; unit heaters of the horizontal, vertical, and blower types; comfort coolers; air conditioning units. Central station air conditioning unit and large capacity blower type unit heater will be featured.

MERCOID CORP., 4201 Belmont Ave., Chicago 41, Ill.—Booths 1137-1139.

In attendance: Hugh Courteol, J. W. Owens, W. L. Colterjohn, I. E. McCabe, W. K. Stauffer, R. F. Fisher, Wm. B. Gearhart, Wm. Ufer, Walter Lischett, A .S. Widdowfield, Myron Wimmer, Al. Hogle.

Exhibiting: Complete line of automatic controls equipped with hermetically sealed mercury switches for heating, refrigeration, and air conditioning.

METALS & CONTROLS CORP. (Spencer Thermostat Co. and General Plate Div.), 34 Forest St., Attleboro, Mass.—Booth 720.

In attendance: All field engineers, headquarters sales personnel, management group.

Exhibiting: "Klixon" automatic controls, featuring inherent motor protection applications; laminated metals in various sizes, shapes, etc. Mounting of "Klixon" protectors on hermetically sealed refrigeration units, and new types of fixed temperature thermostats not previously exhibited, will be displayed.

METROMATIC MFG. CO., 21 Henderson St., Everett 49, Mass.—Booths 107-109-111.

In attendance: Fred D'Angelo.

Exhibiting: "Metropac" air conditioner, and featuring air conditioner with all year 'round domestic hot water.

MEYER FURNACE CO., 1300 S. Washington St., Peoria 1, Ill.—Booth 343.

In attendance: F. L. Meyer, F. E. Mehrings, R. S. Quimby, R. W. Qualley, J. J. Boland, M. R. Baugh, D. L. Schafstall, F. G. Moos, F. W. Zingsheim, A. R. Lyon, W. P. Dennis, J. W. Calhoon, O. C. Schwieger, T. L. Osberger.

Exhibiting: Oil and gas fired basement type units; oil and gas fired "Hi-Boy" units; gravity basement gas fired unit; coal fired basement type air conditioning unit; residential cooling unit. A new line in both of the oil and gas fired "Hi-Boys" for low cost housing application, a new gravity gas furnace for small homes, a new deluxe basement type oil and gas fired unit, with cooling equipment that can be added either to old units or to a new installation, will be featured.

MID-CONTINENT METAL PRODUCTS CO., 1960 Clybourn Ave., Chicago 14, Ill.—Booth 1231.

In attendance: A. F. Zitzewitz, E. J. Haedike, C. F. Petersen.

Exhibiting: New "Lo-blast Economite" gas burner.

MILWAUKEE GAS SPECIALTY CO., 730 N. Jackson St., Milwaukee, Wis.—Booths 1228-1230.

In attendance: J. A. Wolff, S. L. Kile, W. F. Hoeser, John H. Thornbery, Vern C. Kitzrow.

Exhibiting: "Basos," valves, switches, and "Annulair" pilot burners.

MINNEAPOLIS-HONEYWELL REGULATOR CO., 2958 Fourth Ave. S, Minneapolis 8, Minn.—Booths 1046-1047.

MODINE MFG. CO., 1500 DeKoven Ave., Racine, Wis.—Booth 1142.

In attendance: Owen Desmond, Russel McMahon, M. J. Druse, D. S. Paden, Mr. Hardtke, Mr. Luft.

Exhibiting: Convector radiation, unit heaters, and heating and cooling coils, and featuring new heating unit for convectors used on one pipe steam heating systems.

MONARCH MFG. WKS., INC., 2501 E. Ontario St., Philadephia 34, Pa.—Booth 105.

In attendance: J. M. Carroll, J. F. McGuckin, E. B. Frame.

Exhibiting: Oil burner nozzles and burner accessories; air-conditioning nozzle; water strainers; general water spray line. New high efficiency combustion head for oil burners will be featured.

MORRISON PRODUCTS, INC., 16816 Waterloo Rd., Cleveland 10, Ohio—Booth 1217.

In attendance: Thompson Morrison, Al Galaba.

Exhibiting: Blower wheels, blower sides and squares, bearing assemblies.

MORRISON STEEL PRODUCTS, INC., 601 Amherst St., Buffalo 7, N. Y.—Booth 1229.

In attendance: Gene Brown, Fred Evans, Wallace Landau, Floyd Connors, Harold Winningham, Gunnie Cameron, George Knerr.

Exhibiting: "Mor-sun" forced warm air gas fired furnace.

MORSE-SMITH-MORSE, INC., 165 Dexter Ave., Watertown 72, Mass.—Booth 934.

In attendance: John C. Dieselman, Robert E. Chase.

Exhibiting: Fusible shutoff valves, oil filters, safety switches, oil heating accessories.

MOTOR WHEEL CORP.—see DUO-THERM DIV.

MT. HAWLEY MFG. CO., Mt. Hawley Airport, Peoria 4, Ill.—Booth 535.

In attendance: Earl L. Bedard, R. W. Thorne, Gordon Bennett, B. Tooker, C. Sweeney.

Exhibiting: Cutaway boiler and oil burners, and featuring package boilers.

MUELLER FURNACE CO., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 1037-1039-1043.

In attendance: H. P. Mueller, C. L. Hewitt, Jr., F. J. Nunlist.

Exhibiting: "Climatrol" gas fired, oil fired, and coal fired heating and air conditioning units.

MULTI-VENT DIV.—see PYLE-NATIONAL CO.

NASH ENGINEERING CO., Wilson Rd., So. Norwalk, Conn.—Booth 642.

In attendance: Irving C. Jennings, Edward A. Mead, Jack Wright, Harold E. Adams, George B. Wright, George Clucas, J. J. Hayes.

Exhibiting: Variety of pumps for the building and industrial field, including "Jennings" return line heating pumps and condensation pumps, and industrial air compressors and vacuum pumps. A number of these will be in actual operation; advanced designs in all of the equipment will be displayed.

NATIONAL AIR CONDITIONING INC., Johnstown, Pa.—Booth 346.

In attendance: Sigmond Morch.

Exhibiting: Models 1100 and 2200 "Teg" conditioners, featuring new design, for cleaning and humidifying air and vaporizing triethylene glycol into the air.

NATIONAL OIL BURNER CO. OF NEW YORK, 614 Bergen St., Brooklyn 17, N. Y. —Booth 1325.

In attendance: Perry Wolf, Bernard W. Taubkin, Samuel Conviser, Sidney Wolf.

Exhibiting: "Clark National" industrial oil burner for Nos. 5 and 6 oils.

NATIONAL RADIATOR CO., 221 Central Ave., Johnstown, Pa.—Booths 106-108.

In attendance: C. M. Baumgardner, J. W. LeRoy, C. J. Philage, J. W. Hall, K. O. Schlentner, H. W. Williams, C. R. Gunther, L. A. Smith, R. L. Standart, S. S. Wills, Russell Doherty, Stanley Sackol, F. W. Hilger, B. L. Harrower, A. K. Tinker.

Exhibiting: 100 series cast iron oil heating unit; 200 series "Heat Extractor" boiler; residential steel oil heating unit; gas boiler; unit heater; "Pittsburgh" gas unit heater; "Aero" convector and enclosure; "Art" radiators; "NRC" fin tube convector; valves, controls, and heating accessories. Gas boiler, "Aero" convector enclosure, and "Pittsburgh" gas unit heater will be featured.

NATIONAL TUBE CO.—see UNITED STATES STEEL CORP.

NELSON CORP., HERMAN, 1824 Third Ave., Moline, Ill.—Booth 715.

In attendance: Charles S. Stock, M. G. Munson, Howard A. Turner, James Hodges, C. A. Pickett.

Exhibiting: Unit heaters, unit ventilators, propeller fans, centrifugal fans, portable heaters.

NEWARK TRANSFORMER CO., Linden and Park Ave., Linden, N. J.—Booth 113.

In attendance: J. Emil Weissman, Robert J. Natol, Aaron Lee, Marshall T. Brown, Walter P. Crudney.

Exhibiting: Oil burner ignition transformers.

NEW YORK BLOWER CO., 32nd St. & Shields Ave., Chicago 16, Ill.—Booths 1129-1131.

In attendance: Julian Mathis, Jr., George Mathis, Earl E. Trickler, Scott Rost, Charles Flood, John Massey.

Exhibiting: Fans, blowers, unit heaters, propeller fans, steel fin heat coils, make-up air units, blower type "Recirculair" unit heaters, X ray view of "Recirculair," steel base coils, and package type blowers will be featured.

NIAGARA BLOWER CO., 405 Lexington Ave., New York 17, N. Y.—Booth 835.

In attendance: Paul H. Schoepflin, C. F. Gilliam, Donald Crawley, T. V. Lorenz, S. Jones, N. B. Ward, N. L. Baker, E. Douglas, O. F. Dahl.

Exhibiting: New "Aero-pass" condenser, high pressure fan heater, spray cooler, dual cooler, heat exchanger.

NIAGARA FURNACE DIV., FOREST CITY FOUNDRIES CO., 2500 W. 27th St., Cleveland 13, Ohio—Booths 1233-1235.

In attendance: T. S. House, W. G. Harkness, F. T. Goodwin, I. E. Seith, J. T. Harrison, C. H. Eissler.

Exhibiting: Gas, oil, and coal fired air conditioners.

NORGE HEAT DIV., BORG-WARNER CORP., 672 E. Woodbridge St., Detroit 26, Mich.—Booth 508.

In attendance: C. S. Davis, Jr., J. W. Oswald, M. A. Straub, A. F. Michie, H. C. Altenburg, J. C. Cooper, H. W. Ford, G. M. Johnston, A. H. Kitson, J. M. McNamara, W. C. Walter.

Exhibiting: Oil fired air conditioning furnaces, gas fired air conditioning furnaces, coal fired air conditioning furnaces, oil burning utility furnaces, gas fired utility furnaces, convertible furnaces for coal, oil, and gas, oil fired floor furnaces, gas fired floor furnaces, oil fired water heaters, gas fired water heaters, featuring the gas fired floor furnaces and the gas fired air conditioning furnaces.

OLSEN MFG. CO., C. A., Elyria, Ohio—Booths 1024-1026, 1125-1127.

In attendance: Edward P. Hayes, M. H. Klett, James Crombie, E. R. Downe, C. L. Grandstaff, W. H. Olsen, R. H. Olsen.

Exhibiting: Gravity furnaces and air conditioning units, steel and cast iron construction for coal, gas, and oil; furnace pipe, fittings and prefabricated ducts; "Mayn" air dampers. New 1949 models of oil, gun type, air conditioning units; oil, vaporizing units, air conditioning and gravity; gas units, air conditioning and gravity; coal units, air conditioning and gravity with square casings will be featured.

OWENS-CORNING FIBERGLAS CORP., Nicholas Bldg., Toledo 1, Ohio—Booths 1114-1116-1120.

In attendance: Ben S. Wright, C. L. Rowley, G. K. Leisenring, D. M. Browne, J. W. Dowd, J. N. Entriken, J. R. McCord, L. L. Frost, Jr., Wm. Smith, W. H. Atkinson, R. M. Thompson, C. K. Allen, Orville Miller, J. C. Swander, F. M. Waterhouse.

Exhibiting: Application of "Dust-Stop" air filters in "L" and "V" frames; filters for domestic heating equipment; low temperature "AE" board; preformed ("PF") and blanket ("TW-F") high temperature insulation; "Superfine" blanket insulation; duct insulations, boiler insulations; filter media for desert coolers. A new, complete series of insulations for heating, ventilating and air conditioning installations and equipment will be featured, including coated duct insulation for inside and outside of ducts in various finishes; flexible duct insulation in easily-handled blanket form; rigid duct insulation for concealed duct installations; "Superfine" blanket type insulation for boilers; coated rigid insulation and blanket type insulation for packaged air conditioning equipment.

PACIFIC STEEL BOILER DIV., 300 Buhl Bldg., Detroit 26, Mich.—Booths 1012-1014-1016-1020.

In attendance: H. B. Steggall, E. J. Grady, W. E. Everham, H. Gullikson, H. Hathaway, R. H. De Thorne, R. C. Sandstrom, E. F. Hackett.

Exhibiting: Vertical and horizontal unit heaters, plate flue residential boiler, split firebox commercial boiler, and "Pacific-Wing" induced draft fan. An action display of the split firebox boiler and a cross section photograph of an oil fired commercial boiler will be featured.

PATTEN CO., J. V., Sycamore, Ill.—Booth 919.

In attendance: Don C. Patten, John H. Murphy.

Exhibiting: "Sun Fuel-Master" automatic oil furnaces; "Bogue" low pressure oil burner; "Counter-Flo Hi-Boy" furnace for floor panel heating with top-mount blower assembly.

PENN ELECTRIC SWITCH CO., Goshen, Ind. —Booth 447.

In attendance: Albert Penn, M. E. Henning, R. H. Luscombe, K. W. Cash, J. R. Netedu, C. B. Morgan, E. M. Smith, L. D. Linehan, W. S. Lossie, G. O. Sanders, A. L. Rubel, E. A. Price, R. L. Persons, J. G. Moravec, F. X. Fessler, A. W. Barr, J. E. Corbett, H. Gray.

Exhibiting: Automatic controls for heating, refrigeration, and air conditioning.

PENNSYLVANIA FURNACE & IRON CO., 316 Pine St., Warren, Pa.—Booths 1236-1238.

In attendance: R. L. Blodgett, C. S. Andersen, H. J. Harvey.

Exhibiting: Gas fired furnaces and boilers.

% PROPORTIONEERS, INC., %, 9 Codding St., Providence 1, R. I.—Booth 117.

PERFECTION STOVE CO., 7609 Platt Ave., Cleveland 4, Ohio—Booths 1310-1312-1314-1316-1318-1320.

In attendance: E. B. Goodwin, A. B. MacLaren, S. C. Reese, W. R. Wright, R. A. Walls, R. K. Brigance, T. W. Russell, W. M. Potter, A. S. Bergschneider, F. W. Smith, H. C. Erikson, Harold Kiefer, L. C. Williams, R. S. Cadwallader.

Exhibiting: "Superfex" gas and oil furnaces, featuring model 550 suspended oil furnace; model 4100 oil winter air conditioner equipped with gun type burner; model 67 gas winter air conditioner with 150,000 Btu input.

PERFEX CORP., 300 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 428-430-432-434.

PETROLEUM HEAT & POWER CO., Southfield Ave., Stamford, Conn.—Booth 821.

In attendance: W. A. Bulger, J. F. Corrigan, E. F. Groves, H. S. Boyle, R. S. Thoresen, L. R. Babcock, W. F. Johnstone, J. R. Arden, W. J. Hegan, E. A. Goyette, G. A. Jones, J. R. Crews, G. A. Moore, B. B. Randall, Jr.

Exhibiting: Domestic, commercial, and industrial oil burning equipment; boiler-burner and furnace-burner units; instantaneous water heaters; winter air conditioners; and featuring model A-75 warm air unit (75,000 Btu).

PETROMETER CORP., 1 Star Sq., Long Island City 1, N. Y.—Booth 1147.

In attendance: Dan Bierman, Arthur Bierman, Norbert Milair, Joseph A. Jawett, James J. Wargas.

Exhibiting: New liquid depth indicators and tank gages "for all liquids, for all depths, for all tanks, and for all distances"; new "Aerator" manual air compressor. "Flood Proof" automatic positive "Red X" fluid check; "Hilarms" controls to prevent tank spills.

PITTSBURGH CORNING CORP., 632 Duquesne Way, Pittsburgh 22, Pa.—Booth 339.

In attendance: Vic Sanders, R. A. Biggs, C. B. Keown, R. F. Quinn.

Exhibiting: "PC" glass blocks for lighting and insulating buildings; "Foamglas" insulation for aiding temperature control in buildings of all kinds, for hot and cold piping and processing equipment. Exhibit will include a display of pipe insulation showing the wide range of pipe sizes and fittings for which it is adaptable.

PLIBRICO JOINTLESS FIREBRICK CO., 1800 Kingsbury St., Chicago 17, Ill.—Booth 936.

PLUMBING & HEATING BUSINESS, Grand Central Terminal Bldg., New York 17, N. Y. Booth 110.

Exhibiting: Publication.

PLUMBING & HEATING JOURNAL, 45 W. 45th St., New York 19, N. Y.—Booth 528.

Exhibiting: Publication.

PRAT-DANIEL CORP., East Port Chester, Conn.—Booth 1209.

PYLE-NATIONAL CO., MULTI-VENT DIV., 1367 W. 37th St., Chicago 9, Ill.—Booths 1332-1334.

In attendance: George K. Raider, William F. Botensten, Richard A. Meck, Walter M. Nesteruk.

Exhibiting: Air distribution panels for delivering air to an occupied space by means of pressure displacement through a perforated sheet in a draftless manner. The air is controlled by a valve so that each panel may be treated as a specific zone, and the temperature may be held to a tolerance of 1 to 2 deg throughout the entire cubic area of a zone.

QUIET-HEET MFG. CORP., 135 N. J. Railroad Ave., Newark 5, N. J.—Booth 1011.

In attendance: S. L. Peters, H. L. Peters, S. L. Sloan, E. N. Sloan, S. Parson.

Exhibiting: Oil burners, sump pumps, window sill air conditioners, gas burners, convectors.

RADIANT UTILITIES CORP., 8817 18th Ave., Brooklyn 14, N. Y.—Booth 236.

In attendance: Jacob G. Goldberg, Julius S. Goldberg, Arthur A. Marcus, Joseph Bloom.

Exhibiting: Oil burners. Along with the regular line of oil burners, a new adjustable sliding flange mounted burner will be introduced.

RADIATION FURNACE CORP., 230 Bond St., Benton Harbor, Mich.—Booth 916.

In attendance: Sidney Volk, Robert Volk, Esther Volk, Edward Greisz, Charles Preuss.

Exhibiting: Furnaces, featuring new small home unit.

RANDALL GRAPHITE BEARINGS, INC., 609 W. Lake St., Chicago 6, Ill.—Both 324.

In attendance: M. E. Clark, R. H. Thomas, W. E. Dickerson, K. W. Strunk, H. E. Schweigler.

Exhibiting: Pillow blocks and graphited bushings, and featuring new line of low cost pillow blocks.

RAYTHEON MFG. CO., 138 River St., Waltham 54, Mass.—Booth 907.

REDMOND CO., INC., Owosso, Mich.—Booth 1321.

In attendance: James Tweedy, Gilbert Calkins, Elmer Sosine, Robert Curtis, Harvey Wilgus, Paul Cline, Wilfred Fox.

Exhibiting: Four-pole shaded pole electric motors in sizes up to approximately 1/15th hp; two-pole shaded pole electric motors in sizes up to 1/40th hp; six-pole shaded pole electric motors in sizes up to 1/15th hp; single bearing "Monomotor" motors in sizes up to 9 watts output; gear head "Micromotors" down to 2 rpm output; various types of a-c motor-blower units in sizes up to 150 cfm, d-c motor-blower units up to 125 cfm; reactor type speed controllers for use with "Micromotors." Motors with one-fourth section cut away running in a large glass bowl under water, and another motor with one-fourth section cut away operating while resting on a piece of glass without wire connections, will be featured.

REMINGTON AIR CONDITIONING DIV., 59 E. Court St., Cortland, N. Y.—Booths 927-929-931.

In attendance: Herbert L. Laube, William H. Peters, Jack White, Fred Stidfole.

Exhibiting: Complete line of room air conditioning units.

RESEARCH PRODUCTS CORP., 1015 E. Washington Ave., Madison 10, Wis.—Booth 337.

In attendance: John G. Schutz, John D. Wachman, Jr., R. E. Onstad, A. W. Brown.

Exhibiting: "R-P" air filters and grease filters.

REYNOLDS METALS CO., 2000 S. 9th St., Louisville 1, Ky.—Booths 1109-1111.

In attendance: P. H. Fox, J. M. Stuart, H. N. Logsdon, G. F. Voris, J. L. Pontrich, D. J. Phillips, J. A. Graham, D. W. McIver, D. F. Beard, R. W. Christensen.

Exhibiting: Duct work, ventilating hoods, stacks, etc.

RHEEM MFG. CO., 570 Lexington Ave., New York, N. Y.—Booths 406-410-511.

In attendance: R. Cooke, J. Butler, F. Blume, A. Peterson, R. Towne, V. Heinis.

Exhibiting: Central oil and gas fired heating equipment; blowers; stokers; floor furnace; console heaters; electric and gas water heaters.

RICHMOND RADIATOR CO., 19 E. 47th St., New York 17, N. Y.—Booth 614.

In attendance: M. L. Lavorgna, E. C. Riley, R. O. Pallin, S. D. Colhoun, Jr.

Exhibiting: Gas boilers, gas winter air conditioners (cast iron and steel), oil winter air conditioners (steel), and featuring "Two Fuel" winter air conditioners designed to work with either a gas burner or an oil burner.

RIC-WIL CO., 1052 Union Commerce Bldg., Cleveland 14, Ohio—Booth 827.

In attendance: M. A. Hanna, E. R. Benedict, C. W. Wheeler, W. S. McLeish, Herbert Wicks, C. G. Van Schoor, Frank Bennett, Walter Bartel, P. W. Stickney, B. B. Harter.

Exhibiting: Underground, overhead and surface insulated pipe distribution systems for steam, hot and chilled water, oil and viscous fluids of all types. New "Foilclad" insulated pipe units, and a complete piping system such as prefabricated at exhibitor's plant and erected in the field will be featured.

RIDGE TOOL CO., Elyria, Ohio—Booths 1212-1214-1216.

In attendance: E. C. Bliss, R. C. Chamberlin, Frank Zakary, Mike Fried, W. L. Parcell.

Exhibiting: Complete line of "Ridgid" pipe tools, power drive.

RITTLING CORP., 1292-98 Niagara St., Buffalo 13, N. Y.—Booth 1227.

ROBERTS-GORDON APPLIANCE CORP., 137 Arthur St., Buffalo 7, N. Y.—Booth 1225.

In attendance: W. S. Gordon, Jr., L. C. Smyth, R. I. Warnecke, R. T. Huych, D. J. Cross.

Exhibiting: Gas conversion burners, gas furnaces, and featuring combination gas-oil burners.

ROBERTSON CO., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa.—Booths 334-336.

In attendance: J. J. Siddall, R. A. Finlayson, H. L. Lockett.

Exhibiting: Industrial and commercial ventilators, and industrial roofing and siding.

ROTH CO., ROY E., 2420 Fourth Ave., Rock Island, Ill.—Booth 115.

In attendance: P. M. Roth, H. C. Welzenbach.

Exhibiting: Pumps, condensate return units, boiler return systems.

RUBY MANAGEMENT CO., 620 W. Warrington Ave., Pittsburgh 26, Pa.—Booths 1113-1115-1117.

In attendance: Morris Rubenstein, Leonard E. Strong, P. J. Williams, T. E. O'Shaughnessy, Mr. MacIntyre.

Exhibiting: "Williams" conditioners, "Keystone" aluminum storm windows, new "Kleen-Aire" furnaces.

RUSCO AWNING & JALOUSIE DIV.—see RUSSELL CO., F. C.

RUSCO WINDOW DIV.—see RUSSELL CO., F. C.

RUSSELL CO., F. C., 1100 Chester Ave., Cleveland 1, Ohio—Booths 1327-1329-1331-1333-1335.

In attendance: Frank C. Russell, Arthur V. Padou, H. A. Malcom, Glen Schrader, Earle Hancock, Blair Algie, John Duke, L. M. Lamberton, Arthur Wright, Arthur Steinberg, George Mahl, Robert Swearingen.

Exhibiting: "Rusco," "Cinco," and "Thermoseal" all metal combination windows, casement type combination window, "Thermoseal" wood combination window, combination storm door, custombuilt screen, "Duo-Glaze" window insulation, "Rusco" all metal awnings, all metal jalousies, door canopies.

S.O.S. PRODUCTS CO., INC., 282 Nassau Ave., Brooklyn 22, N. Y.—Booth 512.

In attendance: I. S. Pryor, G. G. French.

Exhibiting: A complete line of chemical and refractory products for the plumbing, heating, and oil burner industries. Combustion chambers will be featured.

SAMPSEL TIME CONTROL, INC., 600 N. Strong Ave., Spring Valley, Ill.—Booth 947.

In attendance: D. C. Wellcome, E. A. Rave, L. Putze, F. R. Hulbert.

Exhibiting: Complete line of heating controls, and featuring sequence draft control and thermo-interruption fire pilot.

SANGAMO ELECTRIC CO., 11th & Converse Sts., Springfield, Ill.—Booth 446.

In attendance: C. R. Burt, C. R. Dobson.

Exhibiting: Time switches.

SARCO CO., INC., Empire State Bldg., New York 1, N. Y.—Booths 409-411.

In attendance: G. B. Burke, E. J. Ritchie, R. W. Cumming, L. Barfus, R. L. Stewart, C. Brakenridge, E. Avery, C. F. Panos, D. E. Shrader.

Exhibiting: Complete line of specialties for steam and hot water heating; "Sarcotherm" weather control system for forced hot water and radiant heating; and featuring a new weather control for two pipe steam heating systems in which outside temperature is balanced against steam pressure in the system to provide modulating control by the weather.

SCHWITZER-CUMMINS CO., 1145 E. 22nd St., Indianapolis 7, Ind.—Booths 134-136.

In attendance: Douglas G. Muir, George Schnieders, George Ley, Louis Schwitzer, Jr., H. L. McCormick.

Exhibiting: Adjustable panel window fans; portable floor fans; direct driven exhaust fans; domestic and industrial exhaust fans (belt driven); and centrifugal blowers and blower wheels, and featuring horizontal package ceiling fans, 10 in. adjustable window fans, and new refinements and conveniences on entire line.

SERVEL, INC., 119 Morton St., Evansville 20, Ind.—Booths 1237-1239.

In attendance: J. A. Gilbreath, H. C. Pierce, W. S. McEwen, W. J. Hoeing, F. A. Grossman, J. M. Townsend.

Exhibiting: All-year air conditioner.

SHEET METAL WORKER, 45 W. 45th St., New York 19, N. Y.—Booth 528.

Exhibiting: Publication.

SKIDMORE CORP., St. Joseph, Mich.—Booths 227-229.

In attendance: Vernon F. Radde, Gene Woods, and representatives from sales offices.

Exhibiting: Vacuum and condensate boiler feed pump, condensate and boiler feed pumps, and featuring sump pumps (cellar drainers).

SKUTTLE MFG. CO., 4099 Beaufait Ave., Detroit 7, Mich.—Booth 530.

Exhibiting: Humidifiers for warm air installations; barometric draft controls; humidifier for boiler installations.

SMITH CORP., A. O., Milwaukee 1, Wis.—Booth 1324.

SNIPS MAGAZINE, 5707 W. Lake St., Chicago 44, Ill.—Booth 542.

SPENCER THERMOSTAT CO.—see METALS & CONTROLS CORP.

STEEL PRODUCTS ENGINEERING CO., 1205 W. Columbia, Springfield, Ohio—Booths 1128-1130.

In attendance: A. R. Massman, C. L. Brooks.

Exhibiting: Domestic stokers, commercial stokers, new domestic humidifiers.

STEFCO STEEL CO., Heating Equipment Div., Michigan City, Ind.—Booths 130-132.

In attendance: Roy Smith, J. G. Gregory, John Powell.

Exhibiting: "Panelox" heat resistant stainless steel combustion chamber, which is made of interlocking panels, for oil burners.

STEWART MFG. CO., INC., 610 Bloomfield Ave., Bloomfield, N. J.—Booth 209.

In attendance: Himelblau, Byfield & Co. personnel, Edward Busch, Herbert Waterstraat, Kunen Engineering Co. personnel, James Mac G. Means, Harold E. Pembrook, Fred J. Stewart.

Exhibiting: Complete line of air conditioning, industrial, and residential registers and grilles, and featuring floor register, "Controlaire," "Baldamper," and miscellaneous additional refinements in the air control and heating fields.

STRATTON & TERSTEGGE CO., ANCHOR DIV., P.O. Box 311, New Albany, Ind.—Booths 912-914.

STURTEVANT DIV., WESTINGHOUSE ELECTRIC CORP., 107 Readville Ave., Hyde Park, Boston 36, Mass. Booth 834.

In attendance: J. C. Thompson, A. J. Bronold, L. G. Huggins, H. M. Fisher, P. Cohen, T. E. Smith, J. E. Justice, T. M. Curtin, E. N. Foss, A. C. Thompson.

Exhibiting: New "Silentvane" fan, new "Precipitron" cell and cubicle electronic air cleaner, "Speedheater," air conditioning 100 ton compressor.

SUPER ELECTRIC PRODUCTS CORP., 1057 Summit Ave., Jersey City 7, N. J.—Booths 1133-1135.

In attendance: Charles Rapiport, Henry Winston, Max J. Sarver, George R. Eulo, Arthur T. Koyce.

Exhibiting: Ignition transformers for oil and gas burning equipment, both domestic and industrial.

SYNCROMATIC CORP., 1141 Tenth St., Watertown, Wis.—Booth 1106.

In attendance: R. C. Jaye, H. M. Stillman, W. O. Skold, James Sullivan, George Day.

Exhibiting: Coal fired gravity furnace; coal fired forced air furnace; oil fired forced air furnace, basement model; oil fired forced air furnace, "Hi-boy" model, gas fired forced air furnace, basement model, gas fired forced air furnace, "Hi-boy" model. New coal fired furnace front with ground fit doors with steel cover will be featured.

TACO HEATERS, INC., 137 South St., Providence 3, R. I.—Booth 442.

In attendance: J. Balter, E. T. Houlihan, Fred W. Luft, Jr., J. R. Murphy, R. T. Schoerner, J. H. White.

Exhibiting: Indirect water heaters (tankless and storage types), "Biltin" water heaters (tankless and storage types), instantaneous steam heaters, water circulating pumps, venturi fittings, "Taco-Matic" valves, "Paneltrol" flow checks, relief valves, reducing valves, tempering valves. The "Taco-Vent," an automatic hot water air valve, will be featured.

TAL BENDER, INC., 417 N. Water St., Milwaukee 2, Wis.—Booth 129.

In attendance: E. T. Tal, E. Luprecht, Mrs. C. L. Tal, E. R. Habermehl, A. C. Rota.

Exhibiting: Portable hydraulic pipe benders; copper tube bender for sizes ⅜ to 1 in. with 10 sizes of formers in various radii; tube bender for sizes 1 to 2 in. OD; and featuring new portable tube bender especially developed for radiant heat, panel heat, and bending coils in copper tubing for many other requirements.

TEMP-CONTROL, INC., 208 E. State St., Peoria 2, Ill.—Booth 1307.

In attendance: Leonard Landwirth, Stanley Bernstein, Virgil Felker, Richard Barthelmess, Alvin Dattle, Myrick Glenn, Martin Janasik, Sam Moncher, Bernard Packtor.

Exhibiting: Air conditioners, evaporative condensers, "Jaden" blowers, and featuring combination cold water cooling and hot water heating unit.

TENNESSEE COAL, IRON & RAILROAD CO.—see UNITED STATES STEEL CORP.

THATCHER FURNACE CO., Center St., Garwood, N. J.—Booth 405.

In attendance: C. Sahler, R. M. Cook, M. Beard, D. Turner, H. Downe, F. W. Sieffert, S. Baughman, C. Meehan.

Exhibiting: New gas fired air conditioner, oil fired "Comfortmaster," oil fired air conditioners, coal fired air conditioner, "Thermaster" gravity furnace, "Oilmaster" boiler, new gas "Hi-Boy," and coal burning forced air furnace. The gas fired winter air conditioner, the coal fired winter air conditioner, the gas "Hi-Boy," and the coal burning forced air furnace will be featured.

THERMOMATIC CORP., Church & Elm Sts., Willoughby, Ohio—Booth 1224.

THERMOSEAL WINDOW DIV.—see RUSSELL CO., F. C.

THRUSH & CO., H. A., Peru, Ind.—Booths 520-522.

In attendance: E. D. Noland, J. Munro, L. Black, P. F. Thompson, G. H. Fox.

Exhibiting: Complete line of hot water heating specialties, and featuring live display of "Ajustaflo" balanced single main hot water heating system (including circulator) and flow control valve.

TORRINGTON MFG. CO., 70 Franklin St., Torrington, Conn.—Booth 342.

In attendance: Donald G. Leslie, David R. Upson, W. E. Morrison, F. R. Wheelan, Anthony N. Casadei.

Exhibiting: "Airotor" blower wheels, "Airistocrat" quiet propeller fan blades, and featuring new high efficiency fan blade.

TRANE CO., 2nd & Cameron Ave., La Crosse Wis.—Booths 615-627.

In attendance: W. T. Hancock, E. A. Cline, Jr., C. L. Ringquist, H. C. Rooks, M. L. Hoglund, R. E. Lee, R. G. Lubinsky, R. S. Knowles, F. O. Russell, E. R. Becraft, G. E. Hicke, L. R. Fuller.

Exhibiting: "UniTrane" air conditioning equipment; "Climate Changers;" self contained air conditioners; railroad air conditioning equipment; reciprocating compressors; evaporative condensers; centrifugal fans; propeller fans; aircraft products; cooling coils; heating coils; steam heating specialties; hot water products; shell and tube heat exchangers; propeller unit heaters; blower unit heaters; wall fin heaters; roof ventilators; "Force Flo" heaters; unit ventilators; convector-radiators; circulating pumps; condensation pumps; special heat exchange equipment; Featured will be the "UniTrane" air conditioners, multiple zone "Climate Changers," "Kinetic" orifice steam distributing tube heating coils, "Cloverleaf" diffusers, horizontal propeller unit heaters, "Economaire" units, "Custom Air" railroad air conditioners, and a compressed air cooler.

TRIAD PRODUCTS CORP., 5113 N. Clark St., Chicago, Ill.—Booth 128.

In attendance: H. E. Steele, R. L. Geaslen, E. L. Geaslen, J. D. Hawkins, C. E. Tomlin, R. H. Gough, C. Pratt, W. C. Morse, Glen Ingraham, Louis Walsh.

Exhibiting: "Sun Panel" radiant heat.

TRION INC., 1000 Island Ave., McKees Rocks, Pa.—Booth 121.

In attendance: E. W. Meyers Jr., J. W. Frazier, H. C. Fry, W. A. Stone.

Exhibiting: Electric air filters.

TRIPLEX HEATING SPECIALTY CO., Peru, Ind.—Booths 112-114.

In attendance: L. R. Peters, L. H. Wise, W. F. Petty, Fred J. Barr, R. S. Waite, C. E. Denny.

Exhibiting: Complete line of hot water specialties, or models of some sizes, and 1 in. circulator showing head characteristics for radiant heating.

TURNBULL MFG. & DISTRIBUTING CO., 9930 Freeland Ave., Detroit 27, Mich.—Booth 1206.

In attendance: R. S. Turnbull, J. J. Manica, H. C. Blair, C. W. Davis, T. C. French, W. B. Stamberger, Wm. J. Debler.

Exhibiting: "Effecto-Grille" warm air registers and grilles for baseboard, side wall, and floor installations for gravity, forced air, and air conditioning systems. The exhibit will illustrate modern styling in warm air registers and grilles and will introduce new floor register with exclusive "Honeycomb" mesh face.

TUTTLE & BAILEY, INC., New Britain, Conn.—Booth 920.

In attendance: J. H. Smart, R. S. Rickabaugh, R. D. Tutt, H. H. Van Epps, J. F. Wolff.

Exhibiting: Ceiling diffusers, grilles, registers, and air control devices for air conditioning, heating, and ventilating; copper convectors for steam and hot water installations. New type EAC "Aerofuse" ceiling diffuser with effective area control will be featured.

TWENTIETH CENTURY HEATING & VENTILATING CO., 96 Ira Ave., Akron 1, Ohio—Booth 1213.

In attendance: J. G. Kerch, R. K. Long, C. E. Tomlin, Ed. McGann.

Exhibiting: "Zeph Air" oil fired furnace, coal fired furnace, and featuring "Zeph Air" gas fired furnace.

U. S. MACHINE CORP., Lebanon, Ind.—Booths 1246-1347.

In attendance: C. A. Potts, J. O. Williams, H. E. Winkler, Cecil Conner, P. I. Bohmann, Norman Gill, Robert C. Hulse, Carl Lang, L. C. Lynn, T. N. Gadbois, Stanley Glenn, M. H. Goodman, R. W. Kettelkamp, Clark Myers.

Exhibiting: Stoker, low pressure oil burner, high pressure oil burner, space heater, floor furnace, gas burner, furnace and boiler. The low pressure oil burner and the "Imperial Deluxe" floor furnace will be featured.

UNION CARBIDE AND CARBON CORP.—see LINDE AIR PRODUCTS CO.

UNITED STATES AIR CONDITIONING CORP., Como Ave., S.E. at 33rd, Minneapolis 14, Minn.—Booths 1036-1038.

In attendance: L. P. Hanson, D. E. Feinberg, E. J. Conley, C. E. Malone.

Exhibiting: Refrigerated "Kooler-aire" unit (complete package air conditioning refrigeration system), blowers representative of "usAIRco" complete line, new 1949 model store conditioner, new refrigeration window model room air conditioner, two models of "Modu-aire" (new, individual room units for central system, year around air conditioning). Each of the units has new features and design advances which are the result of a program of engineering research and experimental work.

UNITED STATES RADIATOR CORP.—see PACIFIC STEEL BOILER DIV.

UNITED STATES REGISTER CO., Burnham St., Battle Creek, Mich.—Booth 239.

UNITED STATES STEEL CORP., 436 Seventh Ave., Pittsburgh 30, Pa.—Booths 232-331-333-335.

In attendance: E. G. Sheasby, C. F. Block, J. A. Dillon, C. D. Kuhn, A. W. Reid, W. J. Hartney, B. H. Rickard, J. H. Rooney.

Exhibiting: Tubular products, power piping, heat exchanger tubes, galvanized sheets, stainless steel. A demonstration will feature the workability of stainless steel and its application to the heating and ventilating industry, showing the use of light gage stainless steel sheets for air ducts, wall and floor registers, trim, furnace parts, gutters, downspouts, etc.

VIBRATION ELIMINATOR CO., 10-28 47th Ave., Long Island City 1, N. Y.—Booth 910.

In attendance: Mr. Kahn, Mr. Miller, Mr. Semmens.

Exhibiting: Units and bases for air conditioning machinery, fans, compressors.

VIKING AIR CONDITIONING CORP., 5600 Walworth Ave., Cleveland 2, Ohio—Booths 517-521.

In attendance: Marion I. Levy, Frank P. Gibbons, Tom J. McIntyre, Forest R. Phillips, John A. Green, Malcolm Mackenzie, M. H. Esser, Ed Lokey.

Exhibiting: Blower packages, blower assemblies, automatic humidifiers, humidity products, window fans, and attic fans. New streamlined blower package, "W" series blower assembly, window fan line, and attic fan line with new timer control will be featured.

VIKING MFG. CORP., 1747 Chester Ave., Cleveland 14, Ohio—Booth 635.

In attendance: H. S. Frasher, P. B. Patton, W. P. Loer, C. W. Smith, J. G. Baker, T. C. Kitchen, M. C. Cameron.

Exhibiting: Oil furnaces; gas furnaces; oil, gas, and electric water heaters; gas and oil floor furnaces; oil space heaters; packaged air conditioning; "Flatpak" aluminum ductwork. Complete domestic heating systems, furnaces, and ductwork will be featured.

VULCAN RADIATOR CO., 26 Francis Ave., Hartford 6, Conn.—Booth 1008.

In attendance: Richard B. Sweet, Thomas L. Arnold, John H. Ehn, Thomas F. O'Connor Jr., C. H. Bevington.

Exhibiting: Baseboard radiation, extended surface, ferrous and non ferrous; and standard extended fin surface. New front outlet baseboard cover will be featured.

WALTON LABORATORIES, INC., 1186 Grove St., Irvington, N. J.—Booths 1007-1009.

WATERMAN-WATERBURY CO., 1121 Jackson St., N.E., Minneapolis 13, Minn.—Booth 1006.

In attendance: Harry Cross, David Sedgwick, Jim Bazille, Ted Doering, Brighton Eddy, Robert Carlson, Otto Griefnow, Roy Lonson, Don Mitchell, Stuart Smith, Jack White, Everett Borst.

Exhibiting: Warm air furnaces and air conditioners, master "Blowertrol."

WATTS REGULATOR CO., 10 Embankment St., Lawrence, Mass.—Booth 534.

In attendance: Wendell Dillon, George B. Horne, Mike Mercury, Cy Gates, B. E. Horne.

Exhibiting: Automatic temperature and pressure regulating safety devices.

WEBSTER ELECTRIC CO., 1900 Clark St., Racine, Wis.—Booth 533.

In attendance: B. T. Wiechers, E. M. Ford, L. H. Ehrich, S. A. Loeb, H. B. Hastings, D. J. Munroe, A. C. Kleckner.

Exhibiting: Fuel units and ignition transformers, featuring "Thermodrive" kit for converting to controlled air circulation and instantaneous (magnetic) cutoff fuel units.

WEBSTER & CO., WARREN, 17th & Federal Sts., Camden, N. J.—Booths 208-214.

In attendance: H. F. Marshall, N. W. MacNichol, B. F. Lerch, D. F. Bennett, W. M. Brown, E. K. Webster, Jr., D. E. Morgan, C. J. Kern, L. H. Plum, P. W. Stickney, B. B. Harter, J. B. May, L. P. Lang, F. A. Laird.

Exhibiting: Steam, vapor, vacuum, and hot water heating systems; "Moderator" low pressure steam heating systems with automatic outdoor control of steam flow and heating effect; baseboard heating; convector radiators; "type WI" convector surface; steam heating and process specialties. Baseboard heating for individual homes and one and two story garden apartments will be featured, as will continuous flow hot water heating controls for moderate sized buildings.

WEIL-McLAIN CO., Michigan City, Ind.—Booth 721.

In attendance: J. A. McDonnell, J. E. Sorensen, C. R. Finnell, E. R. Westphal, W. R. Stockwell, R. M. Stockwell.

Exhibiting: "57 series" all fuel boilers, "87 series" all fuel boilers, "G series" gas boiler, round boiler, "Raydiant" radiation, "Solray" radiation.

WESTINGHOUSE ELECTRIC CORP., 511 Wood St., P. O. Box 868, Pittsburgh 30, Pa.—Booths 305-309.

WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV.—see STURTEVANT DIV.

WHEELING FURNACE CORP., 2nd & Jefferson, Martins Ferry, Ohio—Booth 543.

In attendance: E. W. Stifel, Jr., H. T. Harrington, Richard Fair, G. C. Prettyman.

Exhibiting: Smokeless "Smokabator" furnace, "Tuberator" furnace. The smokeless furnace "has been approved by the smoke abatement commissions of Pittsburgh, Akron, and Detroit."

WHITE MFG. CO., 2362 University Ave., St. Paul 4, Minn.—Booth 125.

WHITE-RODGERS ELECTRIC CO., 1209 Cass Ave., St. Louis 6, Mo.—Booth 205.

In attendance: Jack Searls, J. A. Rodgers, E. C. Robinson, Wm. Morrisey, Chas. O'Brien, Ray J. Schmitz, G. R. Gibson, F. L. Banner.

Exhibiting: Complete line of automatic controls for heating and air conditioning. "Level Temp," a new system of automatic heating control "which is available at moderate cost and provides efficient, economical operation of the heating plant," and indoor-outdoor control for radiant panel and all types of conventional hot water heating which maintains "constant indoor comfort and saves fuel by varying the water temperature of the heating system in accordance with changes in outdoor weather, balancing for the heat loss of the individual home," will be featured.

WHITTINGTON PUMP & ENGINEERING CORP., 1126 Prospect St., Indianapolis 3, Ind.—Booths 513-515.

In attendance: Dick W. Whittington, L. E. Ritzman, A. L. Crump, Lyman Crump.

Exhibiting: Vacuum heating pump, condensate pump, and featuring new combination vacuum-pressure clinical pump unit.

WILL-BURT CO., 202 S. Main St., Orrville, Ohio—Booth 928.

In attendance: E. G. Baer, J. R. Furth, Ted Luellen, E. W. Krieble, R. M. Warren.

Exhibiting: Oil fired boiler unit, conversion oil burner, and residential bin-feed stoker, and featuring oil fired steel heating boiler of new "Intra fire tube, water tube" design for residential forced circulating hot water systems.

WILSON & CO., INC., 4100 S. Ashland Ave., Chicago 9, Ill.—Booth 506.

In attendance: R. M. Seepe, J. G. Wilsey, T. L. Osberger, Neil Reisdorph, Harold Winningham.

Exhibiting: "Edgeseal" and "Honeycomb" hair filters, and other hair division products.

WILSON CO., H. A., 105 Chestnut St., Newark 5, N. J.—Booth 133.

In attendance: Judson Strong, Chester Tappan.

Exhibiting: "Wilco" thermostatic bimetals, electrical contacts, silver clad steel for industrial use, "Ni-Span C" constant modulus alloy, low and high expanding "Ni-Span" alloys, jacketed wire, special alloys (including high conductivity, high strength, copper alloys), rolled gold plate and gold filled wire. Thermometal R-16, a new bimetallic trip element for high capacity circuit breakers, and "Ni-Span C", a constant modulus alloy having high physical properties and available in rod, wire, strip, tubing, and forgings will be featured.

WING MFG. CO., L. J., 154 W. 14th St., New York 11, N. Y.—Booth 320.

In attendance: H. S. Wheller, C. H. Smith, C. W. Diemecke, H. L. Kister, A. D. Foster, H. J. Clemens.

Exhibiting: "Wingfoil" axial flow ventilating fans and exhausters, both straight line and elbow types; unit heaters, low pressure steam turbine and motor driven; combustion equipment, consisting of forced draft and induced draft fans, transformer cooling fans. There will be an experimental test setup demonstrating how fan capacities are obtained, and a display of axial flow fans of various types, the blades all being made of hollow steel by a special process for strength and lightness.

WORTHINGTON PUMP & MACHINERY CORP., Harrison & Worthington Sts., Harrison, N. J.—Booth 824.

In attendance: C. E. Wilson, M. M. Lawler, W. F. Bishop, E. R. Michel, P. H. Shaw, F. Watt, J. C. Conrad, L. C. Carroll, E. Anderson, K. N. Critchfield, J. Waite, C. S. Rudloff, D. J. Michelson, C. V. Bengle, L. Duncan, D. McCuaig, B. T. LaPierre, R. P. March, C. Neibauer.

Exhibiting: Centrifugal refrigeration compressor, "Freon" compressors, ammonia compressor, air conditioning units, evaporative condenser, product cooler, unit heater, coils. The 7½ ton RCY self contained air conditioning unit—an addition to the exhibitor's line of packaged conditioners, which is now complete from 3 to 15 tons—will be featured, as will the UCY product cooler, which represents a series of these units recently developed to cover the range from 1600 to 13,000 cfm and 3 to 37 tons. The refrigeration coils, for direct expansion or chilled water and furnished in depths of 4, 6, and 8 rows, have a bright, polished finish which is easy to clean.

YARNALL-WARING CO., Chestnut Hill, Philadelphia 18, Pa.—Booth 435.

In attendance: H. J. Moyer, C. H. Simmons, F. H. Vaughan, J. F. Long.

Exhibiting: Samples of "Yarway" impulse steam traps, fine-screen strainers, illuminated panels showing traps and strainers on process cooking kettles and on unit heaters; samples of line of spray nozzles for air conditioning and water cooling; exhibit models of "Gunpakt" expansion joints; continuous showing of new animated film, Impulse Steam Trap and How It Works.

YOUNG RADIATOR CO., 709 S. Marquette St., Racine, Wis.—Booth 206.

In attendance: F. M. Young, John J. Hilt, W. H. Schleck, W. G. Schlichting, H. F. Brinen, P. J. Menden, F. A. Powers, W. P. Nevins.

Exhibiting: Convectors, unit heaters, heating and cooling coils, air conditioning units, featuring new convector line and new cabinet unit heaters.

ZONE-HEAT REGULATOR CO., Box 188, Garrettsville, Ohio—Booth 143.

In attendance: J. L. Markis, E. Carroll, J. Barlow, H. Baxter.

Exhibiting: Zone heat regulator valve for hot water heating systems, comprising six outlets representing six zones, and each zone consisting of a thermostat and one or more radiators or coils; zones can be controlled independently or collectively as desired, and use one common return and one circulator pump.

Heating, Piping & Air Conditioning

AMERICAN SOCIETY of HEATING and VENTILATING ENGINEERS

Journal Section

Heat Transfer Rates for Refrigerant Boiling in Horizontal Tube Evaporators

By L. G. Seigel[*], W. L. Bryan[**], and M. C. Huppert[†]
Cleveland, Ohio

This paper is the result of research sponsored by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS in cooperation with the *Case Institute of Technology*

SUMMARY—Data are presented in this paper showing the variations in heat transfer rate which occur when Freon-12 is boiled inside smooth horizontal tube evaporators. The evaporators studied were all $\frac{5}{8}$ in. O.D. (0.555 in. I.D.) copper tubes having *L/D* ratios (*i.e.* ratio of heated length to inside diameter) ranging from 123 to 432. It was found that reasonable correlation of heat transfer could be made in terms of the temperature difference between the Freon and the tube wall, the weight flow of Freon, and the surface area of the evaporator. Using this correlation, it was possible to account for the effects of evaporator pressure, percentage of flash gas, and *L/D* ratio. Oil quantity was found to have relatively little effect on heat transfer in the range covered by these tests. Pressure drop was measured, but was of such a low value that it was not practicable to correlate it with heat transfer or *L/D* ratio

In spite of the general use of dichlorodifluoromethane (Freon-12) as a refrigerant in direct expansion heat exchangers, little basic information is at hand regarding its heat transfer behavior. Generally, it has been assumed that evaporating Freon has some average heat transfer coefficient and then this coefficient has been applied to heat transfer equipment to obtain performance data. This has sometimes resulted in erratic performance data and in some cases may actually lead to the selection of improper equipment for a given service. Therefore, the object of this investigation was to examine and to correlate the factors which seem to have the most significant effect on heat transfer such as loading, oil circulation with the Freon, *L/D* ratio, refrigerant flow, and temperature difference, tube to refrigerant.

Scope of Investigation

This paper gives the results of a series of tests on three simple straight tube evaporators. It was decided to begin the investigation with these tests in view of the fact that industrial evaporators often are complicated by methods of circuiting and of loading. Therefore, the data presented here represent essentially basic performance for evaporating Freon-12 in single tubes. Application to complicated heat exchangers should be made with due caution. In these tests, no attempt was made to control the amount of oil circulating with the Freon. However, tests were run both with and without an oil separator and attempts were made to measure the oil quantity in circulation. Tests were also run to determine the effect of excess liquid at the evaporator outlet. In all cases, subcooled liquid was supplied to the expansion valve. Saturation temperatures in the evaporators ranged from 30 to 80 F.

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[**] Assistant Professor, Heat-Power Engineering, Case Institute of Technology. Member of ASHVE.

[†] Graduate Student, Case Institute of Technology.

For presentation at the 55th Annual Meeting of the American Society of Heating and Ventilating Engineers, Chicago, Ill., January 1949.

Description of Test Equipment

The equipment used for the purpose of these tests consisted of a one ton reciprocating type Freon condensing unit equipped with a variable speed drive and a water cooled condenser. The condenser was insulated so that a heat balance could be obtained and used as a check on the heat transfer calculation for the evaporator. A schematic diagram of the set-up and arrangement of evaporators is shown in Fig. 1.

Freon and water temperature measurements were made with matched thermometers capable of being read to 0.1 F deg (0.2 deg graduations), and tube temperatures were measured by means of calibrated copper-constantan thermocouples attached directly to the tubes according to good practice[1]. The entire thermocouple system was calibrated before use by comparison with the same matched thermometers used in the Freon circuit. Also as a running check on the thermocouple system, check couples were installed at the same locations as certain mercury thermometers. Evaporator pressure measurements were taken through a manifold system connected to a common gage so that a reliable pressure difference would be obtained.

All evaporators were made of ⅝ in. O.D. copper tube. Those referred to as Nos. 1, 2 and 3 had one return bend and had *L*/*D* ratios of 432, 235 and 123, respectively. One water heated evaporator for which results are also shown consisted of a ⅝ in. O.D. straight copper tube.

Method and Procedure

Each test run consisted of a set of 5-min readings of all instruments for a period of approximately one hour after equilibrium conditions had been obtained. Evaporator suction temperature was taken as the saturation temperature corresponding to the suction pressure. However, this method of obtaining evaporator temperature was under constant check by thermocouple, and was accepted only after preliminary tests indicated that the charge of Freon in the system actually agreed with the published data for Freon-12. A heat balance on the water cooled condenser was computed for each run and the flow of Freon was obtained from this balance. This Freon flow was then applied to the enthalpy rise across the evaporator to obtain the evaporator load. Plots of transformer current against evaporator load were made for each evaporator for all runs in which the Freon was superheated leaving the evaporator. This provided curves of current flow vs. load which were used to determine evaporator loads for tests in which the Freon left the evaporator as a wet mixture.

A rotameter installed in the liquid line before the expansion valve was also calibrated during the tests which were run with superheated vapor leaving the evaporator. This calibration permitted the evaluation of the Freon flow for tests run under conditions of a wet mixture.

The rotameter tube also provided a means for determining the specific gravity of the liquid before the expansion valve by inserting a hydrometer float in place of the rotameter float. This was done in an effort to observe any change in specific gravity which would indicate the presence of oil. However, no appreciable variation in specific gravity was observed.

Condenser water temperature measurements were made with thermometers which had 0.2 deg graduations and had a calibration accuracy of ± 0.1 F deg. All other temperature measurements were made with copper-constantan thermocouples connected to an electronic potentiometer. The scale of this instrument could be read to ± 0.1 F deg. The thermocouples were calibrated in place with thermometers of ± 0.1 F deg accuracy.

Results

The experimental results for the three electrically heated evaporators are shown in Fig. 2. Also shown on the same figure for comparison are four test points from a water heated evaporator previously tested. The tube diameter of the water heated evaporator was the same as used in the electrical evaporators. However, the water heated evaporator was a straight ⅝ in. O.D. copper tube 20 ft long, and therefore, the *L*/*D* value did not include a return bend as did the *L*/*D* values for the electrical evaporators.

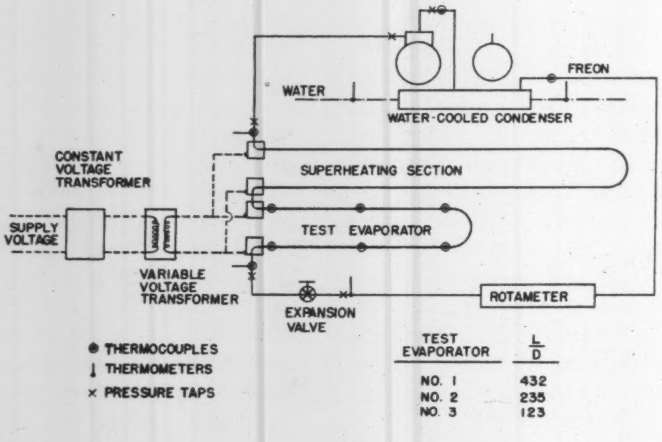

Fig. 1—Schematic diagram of Freon-12 heat transfer test setup

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[1] Temperature, its Measurement and Control in Science and Industry—Sponsored by Symposium Committee of *American Institute of Physics*. (Reinhold Publishing Corp., N.Y., 1941.)

As may be observed from Fig. 2, a correlation was obtained for all evaporators when the data were plotted in terms of $\frac{Q}{AW_F}$ $vs.\ \Delta t^*$. All the data plotted in Fig. 2 were obtained from tests in which the Freon left the test section with a quality in the range of approximately 30 to 80 percent. However, the results of other tests run with approximately 10 deg superheat at the evaporator outlet indicate that the correlation of Fig. 2 is reliable within the limits of experimental error throughout the entire evaporation range up to 100 percent quality. These results are shown in Table 1.

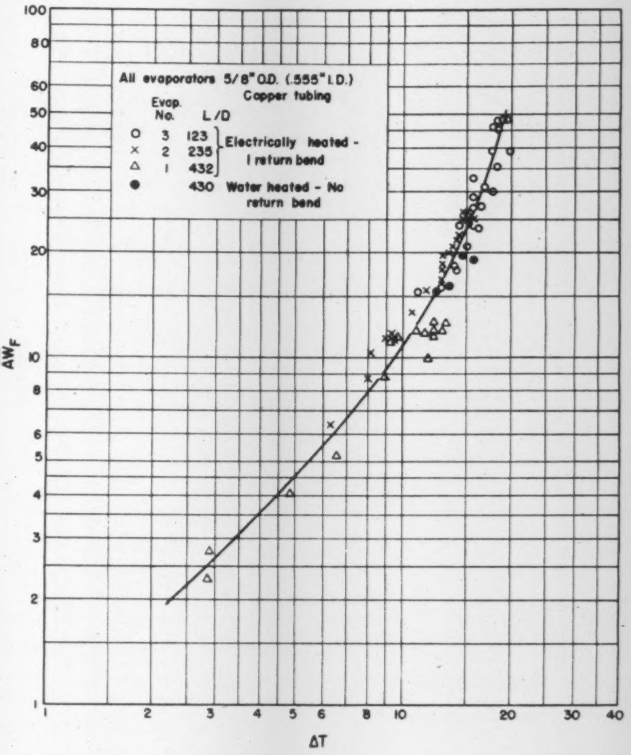

Fig. 2—Heat transfer rates for Freon-12 in four horizontal tubular evaporators

$\frac{Q}{AW_F}$ = Heat transfer Btu per (hour) (square foot internal surface area) (pound Freon-12 flow per hour)

Δt = Temperature difference between tube and refrigerant, Fahrenheit degrees

Effect of Oil

In an attempt to investigate the effect of oil on the heat transfer rate, the specific gravity of the Freon liquid before the expansion valve was measured by means of a hydrometer installed in the rotameter tube after the float had been removed. No variation in either specific gravity or heat transfer rate could be observed in a series of tests during which the compressor speed was changed in an effort to carry over a variable quantity of oil for each test. However, changes in the color of the liquid before the expansion valve and the readings of thermometers located at the evaporator outlet indicated that the oil quantity did actually vary, although it produced no appreciable change in specific gravity or heat transfer. Therefore, an oil separator was installed in the system after the tests were run on evaporator No. 1. Evaporators Nos. 2 and 3 were tested with the oil separator in operation. The liquid before the expansion valve was clear in all tests after the installation of the oil separator and no further difficulty was encountered with the thermometer readings. These facts indicate that less oil was in circulation during the tests of evaporators Nos. 2 and 3 than during the earlier tests of evaporator No. 1. However, there was still no noticeable change in heat transfer rate as indicated by the relatively good agreement of all results shown in Fig. 2. The somewhat greater scatter of the points for evaporator No. 1 may have been caused by inaccurate temperatures. It was found to be difficult to obtain accurate temperature measurements with oil present.

Table 1—Comparison of Results for Superheated Vapor with Those for Wet Mixture[a]

Evaporator Temperature F	$\frac{Q}{A}$	$\frac{Q}{AW_F}$	Full Tube Length		Half Tube Length		
			Δt	Superheat F deg	Δt	Superheat F deg	
30.1	1945	19.7	20.2	11.9	19.1		← WET MIXTURE →
39.3	1900	19.9	16.6	8.7	15.7		
49.6	1875	20.0	17.3	9.7	15.8		
56.7	1810	20.4	19.0	9.1	15.7		
30.6	1950	19.8	17.0	10.0	16.8		
41.5	1900	20.1	20.6	14.0	16.0		
48.9	1915	20.3	17.6	10.5	15.8		
56.1	1820	20.7	18.3	10.8	16.7		
46.0	1890	20.0	17.4	9.3	15.6		
18.3	1760	19.2	13.9	10.6	14.8		

[a] From tests of Evaporator No. 1 before addition of superheater section.

Effect of Flash Gas and Quality

Flash gas entering the evaporators ranged from 8.5 to 20 percent and no appreciable effect was noticed due to its presence when the data were correlated as shown in Fig. 2. Approximately the same amount of *scatter* of points resulted in data plotted at constant flash gas as in those plotted without consideration of flash gas. However, it should be recognized that the ordinate of Fig. 2 actually accounts for

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*See list of symbols.

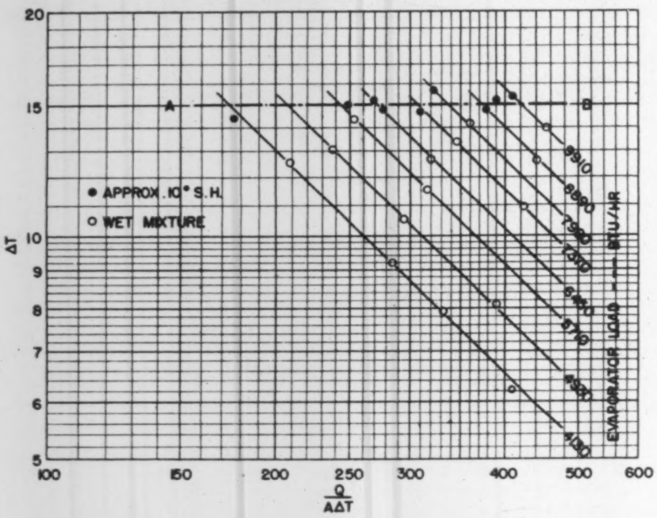

Fig. 3—Variation in heat transfer coefficient with Δt and evaporator load (from tests of evaporator No. 3)

Δt = Temperature difference between tube and refrigerant, Fahrenheit degrees

$\frac{Q}{A\Delta t}$ = Heat transfer, Btu per (hour) (square foot of internal surface area) (Fahrenheit degree difference between tube and refrigerant)

variable flash gas since $\frac{Q}{W_F}$ is really the heat absorbed per pound of Freon. In cases where the Freon leaves the evaporator at 100 percent quality $\frac{Q}{W_F}$ varies with the flash gas percentage for a given pressure.

It is interesting to examine further the ordinate of Fig. 2 for conditions of 100 percent quality leaving the evaporator and 0 percent flash gas entering the evaporator. Under these conditions, $\frac{Q}{W_F}$ becomes equal to the latent heat of vaporization and the ordinate for a given evaporator pressure and area becomes a maximum. For Freon-12 the heat of vaporization is nearly constant in the range of normal evaporator operation. Therefore, $\frac{Q}{AW_F}$, as well as Δt, must also be nearly constant for a given evaporator. Fig. 3 is an attempt to demonstrate this fact. The scatter of the points along the line of constant Δt (line A-B) in this figure may be attributed to an inability to maintain 100 percent quality and to obtain 0 percent flash gas.

Conclusions and Recommendations

1. The heat transfer rate for Freon-12 evaporating in horizontal tubes may be correlated in terms of $\frac{Q}{AW_F}$ vs Δt. Additional tests should be run with different tube diameters.

2. The presence of oil in Freon-12 evaporators does not seem detrimental to heat transfer when the oil is present in quantities such as obtained with ordinary commercial equipment. However, quantitative tests should be run to determine how much oil can be tolerated before the heat transfer is affected.

3. L/D ratios from 123 to 432 had no effect on heat transfer. However, only one tube diameter was used in this investigation and, therefore, similar data should be obtained for other tube diameters.

4. Shorter tube lengths (smaller evaporator areas) gave greater values of $\frac{Q}{A}$ and Δt. Still smaller evaporators should be investigated to determine limiting conditions.

List of Symbols

A = Internal surface area of evaporator, square feet

Q = Total heat transferred, Btu per hour

W_F = Freon-12 flow, pounds per hour

Δt = Temperature difference between tube and refrigerant, Fahrenheit degrees

L/D = Ratio of heated length to inside diameter

HOME VENTILATION

A ventilating system suitable for all weather conditions and especially designed for the four or five room home is described in the University of Texas publication No. 4-813, Intermittent Service, Iced Ventilating System.

Working with the Commerce Department, the University developed a unit ice-evaporative cooling-fan ventilating system, and constructed a pilot model which was tested under varying conditions. Detail drawings are reproduced in the publication, with many graphs and charts showing the test results. Photographs of the interior and exterior of the model are included.

The conclusion drawn in this book is that the manufacture of a packaged unit of the general type of the test model is feasible, with the probable use of a different size. The system is said to be positive for all weather conditions and to have a simple mechanical layout, with few parts to give trouble.

The publication states that a commercial unit could be manufactured in quantity production for well below $1000 and that any competent mechanic could install and service the unit.

Authors of the book are: James D. McFarland, Project Supervisor, Harold A. Tankersley, Research Associate, and Willis R. Woolrich, Dean of the College of Engineering. All are members of the Bureau of Engineering Research, University of Texas.

Single copies may be obtained from the Bureau of Engineering Research, The University of Texas, Austin 12, Texas, free of charge, and additional copies may be purchased at $.50 each.

JOURNAL SECTION

Performance of an Electrical System of Panel Heating with Four Stages of Insulation

By R. J. Lorenzi*, New Haven, Conn. and J. F. Schreiber**, Passaic, N. J.

In spite of the numerous articles which have appeared in behalf of the economic and comfort advantages of insulation when used in conjunction with heating equipment, the authors are not familiar with any publication in which a cost analysis has been made based on actual experimental data taken in a full-scale residence heated electrically and tested with varying degrees of insulation.

This article deals with the performance and economy of operation of a panel heating system in which the source of energy is a layer of electrically conductive rubber. The installation was made in a full-scale experimental four-room house on the grounds of the John B. Pierce Foundation at Raritan, N. J. Data which were obtained during the 1947-1948 heating season are presented for four progressive stages of insulation.

During the entire heating season the test house was occupied by an elderly couple and their daughter. All normal household operations such as cooking, washing, etc., were carried on with no restrictions. The occupants were permitted to set the room thermostats to satisfy their own comfort requirements except during 24-hour periods of continuous temperature recording, which occurred approximately once every two weeks. The occupants were asked to note the thermostat settings.

SUMMARY—A four-room one-floor, occupied residence, completely heated by panels of electrically conductive rubber, was operated through the 1947-48 heating season. Operating results and cost data are reported for the original construction and for three conditions in which the heat loss was progressively reduced by the following steps: (1) change to double glazing of windows, (2) adding 2 in. of mineral wool insulation to ceiling, and (3) addition of 2 in. mineral wool insulation to floor. Comments are made on comfort reaction of occupants and on economic justification of expenditure for reduction of heat loss of the structure.

Description of Test House

Fig. 1 shows an exterior view of of the test house which is built of the prefabricated sandwich type wall construction. The wall panels are composed of 2 in. mineral wool insulation compressed to 1½ in. between sheets of ⅜ in. plywood. No changes were made in the wall construction during the various experimental phases of the program. Windows are of the casement type and were of single glass for the first insulation stage, but were fitted with double glazing for the second, third, and fourth insulation stages. The original ceiling was ⅜ in. plywood panels above which was 2 in. mineral wool insulation, an attic space and a roof constructed of asbestos shingles on ½ in. plywood sheathing. For the series of experiments described in this paper, the original ceiling was furred down using 2 in. x 2 in. furring strips, and the heating panels were nailed to these strips, thus providing an additional air space. After the second insulation step, an additional 2 in. thickness of mineral wool insulation was added in the ceiling thereby providing a total of 4 in. of insulation in Steps 3 and 4. Since the test house had been used for experiments other than those described herein, the floor construction is somewhat unusual, and is as follows: Living room, 1 in. finished flooring over ⅝ in. plywood sub-flooring, 2 in. fiber glass on backer board tacked to bottom of floor joists; Dining-kitchen space, 1 in. finished flooring over ⅝ in. plywood sub-flooring, backer board tacked to bottom of floor joists; Bathroom and Bedroom No. 1, 1 in. finished flooring over reflective insulation draped over floor joists; Bedroom No. 2, 1 in.

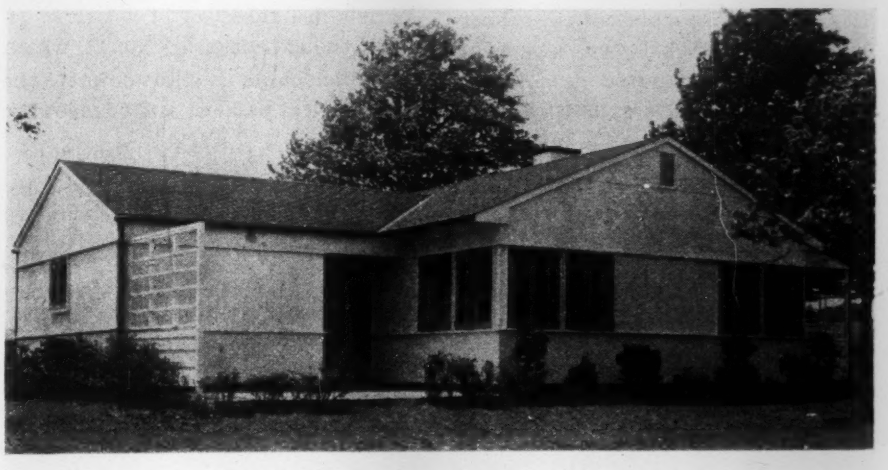

Fig. 1—Four-room residence used in test

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*Research Engineer, Laboratory of Hygiene, John B. Pierce Foundation. Member of ASHVE.

**Development Engineer, Mechanical Goods Division, United States Rubber Co.

For presentation at the 55th Annual Meeting of the American Society of Heating and Ventilating Engineers, Chicago, Ill., January 1949.

finished flooring over reflective insulation draped over floor joists, backer board attached to bottom of floor joists. For the final step in insulation, an additional 2 in. thickness of mineral wool was added to the floor construction in all rooms except the living room.

The overall coefficients of heat transfer for the various surfaces subject to heat loss are given in Table 1 and are expressed in Btu per square foot per hour per Fahrenheit degree. Values are given for each insulation step, and the underlined figures indicate where insulation changes occurred. Heat loss data were obtained on the basis of the generally accepted procedure for heat loss calculations as presented in the HEATING, VENTILATING AND AIR CONDITIONING GUIDE. Infiltration was obtained by the crack method, assuming the average wind velocity to be 15 mph during December, January and February. The heat loss for the structure for the first insulation step was 34,000 Btu per hour. This does not include the ceiling loss which was taken into account by the reverse loss from the heating panels.

Description of Heating System

The radiant panel ceiling heating system was of a type which consists of a natural rubber to which has been added specific materials permitting the conduction of electricity. The rubber provides a uniform heating surface over the entire area. The conductive rubber layer is sealed between layers of phenolic impregnated insulation and the laminated construction is made rigid by a backing of 3/16 in. asbestos board. The completed bonded assembly is approximately ¼ in. in thickness. Three geometrical sizes of heating panels were used for the installation—3 ft x 3 ft, 3 ft x 4 ft, and 4 ft x 4 ft. The panel layout for each room is indicated in Fig. 2, which is a plan of the test house giving room dimensions. Two electrical densities were utilized—12 and 16 w (watts) per square foot, the higher density panels being located near the walls subject to exposure. Panel numbers 6-9, 12-14, 20, and 21, are all rated 12 w per square foot, and the remaining panels are rated at 16 w per sq ft, with the exception of No. 11, which is a filler panel used to complete the geometrical pattern and to meet the architectural requirements. It will be noticed that in some rooms (bathroom, bedroom No. 1, and dining-kitchen area) it was necessary to use 16 w density panels throughout to satisfy the heat loss requirements. Wherever possible full ceiling coverage was used in order to reduce the panel temperatures to a minimum value.

All panels were operated on 220 volts, and the electrical connections to the panels were made with standard building wire of the armored cable type attached through connection boxes fastened to the backs of the panels. There were four main circuits and the total installed capacity was 7300 w. The system was controlled by means of separate thermostats in each room, the thermostats being of the standard low-voltage air actuated type having operating differentials not in excess of ±0.5 deg.

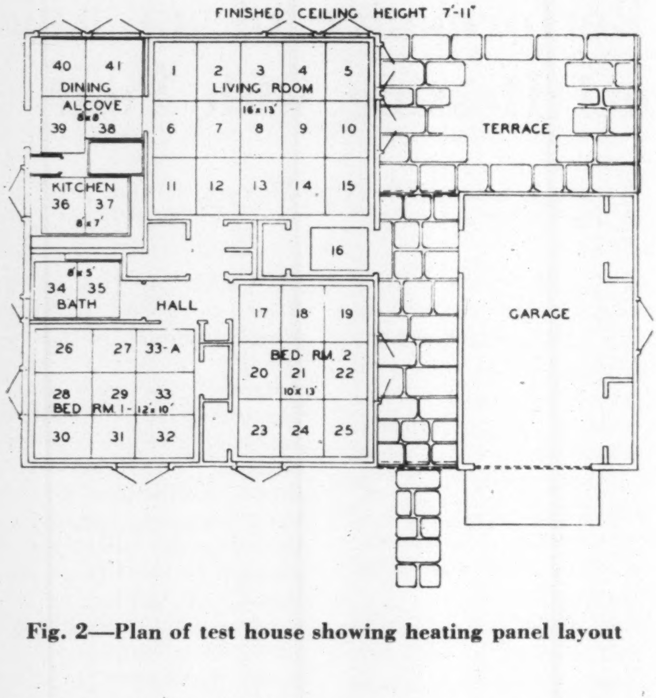

Fig. 2—Plan of test house showing heating panel layout

Table 1—Coefficients of Heat Transmission for Surfaces Subject to Heat Loss[a]
(Btu per square foot per hour per Fahrenheit degree)

	Step 1	Step 2	Step 3	Step 4
Walls—Lintel Girder Panels	0.21	0.21	0.21	0.21
Walls—Middle and Lower Course Panels	0.18	0.18	0.18	0.18
Windows	1.13	0.55	0.55	0.55
Ceiling and Roof (overall coefficient)	0.10	0.10	0.06	0.06
Floor—Living Room	0.08	0.08	0.08	0.08
Floor—Dining Room-Kitchen	0.21	0.21	0.21	0.08
Floor—Bedroom No. 1 and Bath	0.27	0.27	0.27	0.09
Floor—Bedroom No. 2	0.24	0.24	0.24	0.09

[a] Underlined figures show where insulation changes occurred.
Wall, window, and roof coefficients based on a wind velocity of 15 mph.

Electrical and Thermal Measurements

Since normal occupancy was considered to be a critical item in these tests, the physical nature of the recording equipment, its location, and psychological acceptability by the occupying family provided a number of problems. The arrangements finally decided upon were believed to meet the full requirements of informative electrical and thermal performance records with a minimum of inconvenience to the family and without conspicuous external equipment in the living spaces. Electrical data were obtained on total energy consumption, momentary demand, and consumption of power in each controlled area by the use of a watt-hour meter, a recording watt meter, and time meters connected to each area tested. From the data obtained from the instruments, it was possible to determine the system's power consumption, the total load (demand) at any given time, the diversity of this demand with respect to time, and the proportion of energy consumed by any one area for a given length of time.

Thermal measurements were obtained primarily through the use of copper-constantan thermocouples in conjunction with a continuous type chart recorder. In each of the four major rooms on the approximate centerline of one exterior and one interior wall, and 6 in. from these walls, air thermocouples were located 30 in. above the floor. Surface temperature measurements were obtained at the ceilings in all rooms, and thermocouples were also located inside the zone thermostats in each room. For obtaining outside air temperatures both thermocouples and thermometers were used, and wind velocity was obtained by the use of an integrating anemometer.

Experimental Data

A summary of the pertinent experimental data is presented in Table 2. The temperatures of lines 1 and 2 of this table are averages of recordings taken at 15-min intervals for a 24-hr period for each step, and are averages of the four major rooms. The temperatures of line 2 were measured at the lower surface of the heating panels. For lines 3 and 4, the data presented are for the entire test period, that is, for the number of hours shown in line 5. Line 6 is the total degree days for each step as calculated from a 65 F base. Line 7 is the total energy consumed for each test period for house heating only. Line 8 is the total unit power requirement per degree of inside-outside temperature difference, and is line 7 divided by the product of lines 5 and 3. The heat factor of line 9 is another expression of the unit power requirement and is given in terms of kwhr per degree-day per 1000 cu ft of heated volume. Note that this expression uses the degree-day concept and that in calculating line 8, the inside-outside temperature difference was used. Both lines 8 and 9 indicate the measured reduction in unit power requirements for the successive insulation steps, but the heat factor formula of line 9 shows this reduction more positively.

In line 1 of Table 2, the temperatures presented may appear at first glance to be somewhat high for a radiant panel heating installation. However, when it is recalled that the occupants of the test house were an elderly couple, the temperatures appear to be more reasonable. The ceiling panel temperatures of line 2 are also of interest. Note that the highest panel temperature is 106.2 F, occurring with an indoor-outdoor differential of 54.7 deg and that for Step 4—the condition of greatest insulation—the ceiling panel temperature is only 103.2 F for a slightly greater indoor-outdoor temperature differential. In the design of the heating installation the temperature produced by a 16-w density panel, approximately 110 F at 0 F outdoors was selected as a maximum panel temperature for optimum comfort for the 4th insulation step.

From line 9 of Table 2, the reduction in heat factor from 0.70 to 0.51 indicates a saving of approximately 27 percent due to the addition of the storm windows. This checks well with a theoretical saving of 26 percent obtained by computing the heat loss of the experimental house with and without storm windows. However, this saving is greater than normally expected of storm windows and is due to the relatively large glass area in the small house, and the reduction in infiltration loss when the storm windows were added. (The casement windows were not weather stripped.)

Cost Data

The summary of the insulating and operating costs is presented in Table 3. In this table line 1 is the heat factor which is the same as line 9 of Table 2. In line 2 of Table 3, the cost of the heat loss per heating season is presented. These data are based on the heat factor determined by experiment and are the products of the heat factor, the degree-days—5586 for Somerville, N. J.—times 6.48 which is thousands of cubic feet of heated volume, times 2 cents per kwhr plus $24.00 per year demand charge. Electrical energy was purchased from the local utility at the rate of 2 cents per kwhr for all amounts in excess of 200 kwhr per month. There was also a demand charge of $2.00 per kw in excess of 7.5 kw or $24.00 per year.

In line 3 the cost of the insulation investment is given. Under

Table 2—Summary of Pertinent Experimental Data

	Unit	Step 1	Step 2	Step 3	Step 4
1. Air Temperature at 30 in. level..	F	71.7	72.5	71.7	71.2
2. Ceiling Panel Temperature.......	F	100.8	99.0	106.2	103.2
3. Indoor-Outdoor Temperature Difference	F deg	45.1	49.9	54.7	56.8
4. Average Wind Velocity..........	mph	5.8	5.0	7.9	4.6
5. Total Duration of Test Condition.	hr	672	504	168	168
6. Total Degree-Days..............		901	819	321	334
7. Energy Consumption............	kwhr	4101	2680	990	964
8. Unit Power Requirement.........	kw/deg	0.136	0.107	0.108	0.101
9. Heat Factor[a]....................	kwhr/degree-day/1000 cu ft	0.70	0.51	0.48	0.45

[a] Heat Factor Formula to Calculate Electric House Heating, by H. C. Bender, *Electrical World*, May 12, 1945. This *heat factor* is a common denominator by which comparisons can be made and by which energy consumption may be estimated for houses of different size and construction under varying climatic conditions. An analysis of available national information showed that the *heat factor* varied from 0.8 to 0.2 and that similar types of houses had similar heat factors.

Table 3—Summary of Cost Data

	Step 1	Step 2	Step 3	Step 4
1. Heat Factor, kwhr per degree-day per 1000 cu ft	0.70	0.51	0.48	0.45
2. Heat Loss Cost per Season, dollars at 2 cents per kwhr	530.61	395.94	370.29	346.64
3. Net Insulation Investment, dollars	——	183.00	254.70	341.30
4. Amortization Cost, dollars per dollar per year	——	0.08	0.08	0.08
5. Annual Insulation Cost, dollars	——	14.64	20.38	27.30
6. Combined Annual Cost, dollars	530.61	410.58	390.67	373.94
7. Annual Saving During Amortization, dollars	——	120.03	139.94	156.67
8. Annual Saving After Amortization, dollars	——	134.67	160.32	183.97
9. Percent Reduction in Annual Costs During Amortization	——	22.6	26.4	29.5
10. Percent Reduction in Annual Costs After Amortization	——	25.4	30.2	34.7
11. Heat Loss Cost per Season, dollars at 1 cent per kwhr	277.30	209.97	197.15	185.32
12. Combined Annual Cost, dollars	277.30	224.61	217.53	212.62
13. Heat Loss Cost per Season, dollars at ½ cent per kwhr	150.65	116.99	110.58	104.66
14. Combined Annual Cost, dollars	150.65	131.63	130.96	131.96

Step 2, $183.00 represents the installed cost of the storm sash. For Step 3, $254.70 represents the installed cost of the storm sash plus the additional ceiling insulation, and in Step 4, $341.30 is the combined cost of storm sash, ceiling insulation, and additional under-floor insulation. These cost figures are not estimated but are the actual installed cost figures. The amortization cost of line 4 is given in dollars per dollar invested per year, and is based on 20 years at 5 percent. The annual insulation cost of line 5 is obviously the product of line 3 and line 4, and the combined annual costs of line 6 are the totals of lines 2 and 5. Lines 7 through 10 show the savings during and after the amortization period, both in dollars and in percent. It is obvious from line 6 of Table 3 that each successive insulation step has been justified economically, since the combined cost of heating plus insulation investment is progressively reduced with the addition of more insulation.

In line 2 of Table 3, the calculation was based on the actual cost of electrical energy prevailing at Raritan, N. J. The rate in that locality is such that any type of electrical heating falls into a class which might be termed *luxury heating*. Since more logical applications for electrical heating would be in areas where energy could be purchased for approximately 1 cent per kwhr, the annual heating costs have been calculated on this latter basis in the center section of Table 3. It has also been assumed that the test house was subject to the same exposure and heat loss as in tests reported, and that the demand charges and insulation costs are the same, but that the average energy cost is 1 cent per kwhr. The cost of the heat loss on this basis is given in line 11, and the combined annual costs are given in line 12. With this reduced rate, it can be seen that the successive insulation stages may still be justified economically, since the combined cost for Step 4 gives the lowest value.

In the last section of Table 3, a further reduction to an average rate of ½ cent per kwhr has been assumed, and the calculated values are given in lines 13 and 14. With this low rate, notice that the final insulation step cannot be justified since the combined annual cost exceeds that for Step 3. An average rate slightly above ½ cent per kwhr is, therefore, the lowest rate at which all stages of insulation can be justified in this particular instance.

Comfort Observations

During the entire heating season operation continued without difficulty, both panels and controls functioning properly. Good response to the *On-Off* type room thermostat was due to the minimal heat capacity and low thermal lag of the heating panels. This made it possible to control the panel heating system without an outdoor thermostat. In general, the occupants reported comfort during the test periods in each insulation step with the exception of Step 1 in which no storm sash was used. An unsolicited statement by the occupant indicated considerable improvement in comfort by the addition of the storm sash. Comments on cold floor conditions in some rooms (which was expected due to the unusual floor construction of the test house —see description of floor construction given previously) resulted in the addition of the under-floor insulation in Step 4 and showed the necessity of the insulation for this type of construction.

Summary

1. A full-scale residential panel heating installation, using electricity as the source of heat, has been described.

2. Heating panels fabricated of electrically conductive rubber and controlled by *On-Off* air actuated thermostats were utilized.

3. Comparative temperature and power data have been presented for four progressive stages of insulation.

4. Cost data have been presented to show that the successive insulation stages can be justified economically under certain conditions of power cost and climatic severity.

5. Performance was good throughout the heating season, and comfort was reported by the occupants for the final insulation stages.

Acknowledgment

The authors wish to acknowledge with thanks their indebtedness to the U. S. Rubber Co., which supplied the heating panels and sponsored the tests, and to the following members of the Pierce Foundation for their helpful advice and assistance: G. M. Rapp, assistant executive director, Dr. L. P. Herrington, director of research, Physiological Research Division, John Cataldo and E. deF. Tidd, Electrical Division, W. F. Koppes, Architectural Division, E. J. Zelezny, Thermal Division, and also to the members of the U. S. Rubber Co. for their helpful suggestions: Dr. B. W. Bender, Mechanical Goods Division, and R. C. Cassidy, Electrical Wire and Cable Department.

Air Distribution and Draft

By John Rydberg* and Per Norbäck**, Stockholm, Sweden

Among the numerous ways of introducing ventilation air into rooms there are only a few cases in which the air jet course can be determined mathematically. Nevertheless, it has been found that a whole group of discharge devices, for practical purposes, may be satisfactorily computed in advance, both as regards the course of jet and the risk of draft; these are the cases where the air is discharged through concentrated outlets, such as circular or rectangular holes or grids of various designs. The detailed shape of the hole or grid need not be known, the only condition is that the jet be not disturbed by surrounding walls, that the ratio between the longest and shortest side is not too great and that no guide vanes are employed to give the air a special direction.

Similarity Considerations

The discharged air is assumed to have the same temperature as the room air. For free air jets from similar outlets the shape of the jets will be similar if the Reynolds numbers N_{Re} are the same. This means that the velocity V in equally located points will be proportional to the outlet velocities V_o. Two points in different jets are equally located if x/d, y/d, and z/d are equal for both systems (see Fig. 1).

If then, N_{Re}, x/d, y/d, and z/d are equal for different systems, then V/V_o will also have the same value in these systems. Generally, therefore, if f expresses a general function, it is possible to write Equation 1 for jets from similar discharge outlets

$$\frac{V}{V_o} = f\left(N_{Re}, \frac{x}{d}, \frac{y}{d}, \frac{z}{d}\right) \ldots\ldots (1)$$

SUMMARY—Theory of air flow and temperature distribution in jets is discussed. Formulas are developed for determining to what degree air temperature of a stream must be increased to compensate for velocity of air impinging on occupants of air conditioned rooms. In any part of a stream of air from a jet the ratio of excess temperature required to the velocity was found to be a constant so that a subject could be located in any part of the stream with the same feeling of warmth or draft.

A jet from a circular opening will be symmetric about an axis, and in this case one of the coordinates drops out, and then Equation 1 becomes

$$\frac{V}{V_o} = f\left(N_{Re}, \frac{x}{d}, \frac{y}{d}\right) \ldots\ldots\ldots (2)$$

It is found in practice that the effect of N_{Re} is so insignificant that it can be ignored. This can be shown, if it is assumed that the pressure in the jet is constant. This assumption is fulfilled with small error for a free jet, as has been confirmed by measurements. If the pressure is constant then, according to the principle of momentum conservation, in each cross section of the jet, the product of the velocity and the mass flowing forward per unit of time will be constant. Equation 3 then applies for a circular jet, see Fig. 2.

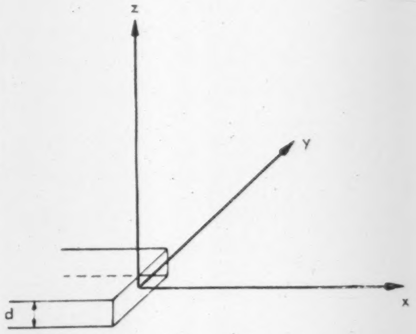

Fig. 1—Diagram for locating points in a jet of air

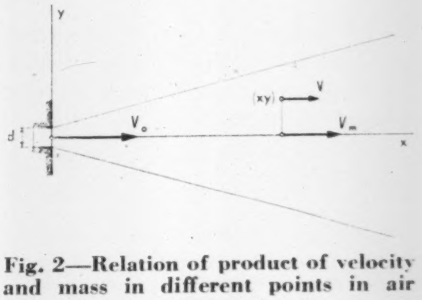

Fig. 2—Relation of product of velocity and mass in different points in air stream

$$V_o^2 \frac{\pi d^2}{4} = \int_0^\infty V^2 2\pi y \, dy \ldots\ldots\ldots\ldots (3)$$

or,

$$\int_0^\infty \left(\frac{V}{V_o}\right)^2 \frac{y}{d} \, d\left(\frac{y}{d}\right) = 1/8 \ldots\ldots\ldots\ldots (4)$$

Equation 4 can only be satisfied by an expression in the form

$$\frac{V}{V_o} = f\left(\frac{y}{d}\right) \ldots\ldots\ldots\ldots (5)$$

The assumption that the pressure is constant means that, for a given section (*i.e.,* for a given value of x/d), V/V_o is only dependent on y/d and consequently independent of N_{Re}. Therefore

$$\frac{V}{V_o} = f\left(\frac{x}{d}, \frac{y}{d}\right) \ldots\ldots\ldots\ldots (6)$$

and also

$$\frac{V}{V_o} = f\left(\frac{x}{d}, \frac{y}{x}\right) \ldots\ldots\ldots\ldots (7)$$

In the center of the jet $y/x = 0$, so that

$$\frac{V_m}{V_o} = f\left(\frac{x}{d}\right) \ldots\ldots\ldots\ldots (8)$$

For a given cross section of the jet, *i.e.,* for a given value of x/d, Equation 9 applies

$$\frac{V}{V_o} = f\left(\frac{y}{x}\right) \ldots\ldots\ldots\ldots (9)$$

Or, when x/d = constant, V_m/V_o = constant,

$$\frac{V}{V_m} = f\left(\frac{y}{x}\right) \ldots\ldots\ldots\ldots (10)$$

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The application of Equation 10 is limited to a given value for x/d.

In practice it is found that for large values of x/d, *i.e.*, for such great distance from the outlet that this may be regarded as a point, the last named function is independent of the value for x/d.[1,2,3,4]

For large values of x/d (great distance from the opening or small openings), it is therefore possible to write

$$\frac{V}{V_o} = \phi\left(\frac{y}{x}\right)\Psi\left(\frac{x}{d}\right) \dots (11)$$

where ϕ and Ψ denote definite functions.

Equation 12 is the result of substituting the expression for V/V_o in Equation 4, derived previously

$$\frac{x^2}{d^2}\Psi^2\left(\frac{x}{d}\right)\int_0^\infty \phi^2\left(\frac{y}{x}\right)\frac{y}{x}\, d\left(\frac{y}{x}\right) = 1/8 \dots (12)$$

As the integral comprised in Equation 12 is constant,

$$\Psi\left(\frac{x}{d}\right) = K_1 \frac{d}{x} \dots (13)$$

and thus, after substitution in Equation 11,

$$\frac{V}{V_o} = K_1 \frac{d}{x}\phi\left(\frac{y}{x}\right) \dots (14)$$

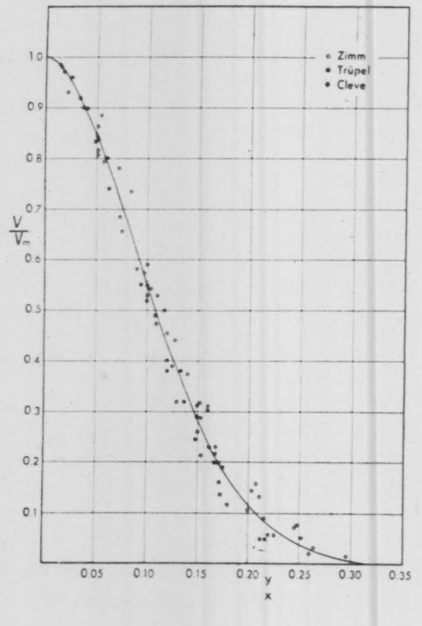

Fig. 3—Value of $\frac{V}{V_m}$ as function of $\frac{y}{x}$

or

$$\frac{V_m}{V_o} = K_1 \frac{d}{x} \dots (15)$$

$$\frac{V}{V_m} = \phi\left(\frac{y}{x}\right) \dots (16)$$

It is advisable to determine empirically the constant K_1 in Equation 15 and the function ϕ must also be determined in the same manner. The constant in question may, in accordance with experimental values of Zimm[2], Trüpel[3], Cleve[4], Kuethe[5], and Ruden[6], be taken for the area nearest the outlet at 6 to 7. McElroy[7] has arrived at the mean value of 5.3. Tuve[8] found that for the first part of the jet, where velocity exceeded 500 fpm, the value of K_1 was approximately 5.5. At the end of the jet, however, where the velocity lay below 500 fpm it was found correct to use lower values for the constant. This decrease of K_1 as stated by both McElroy and Tuve possibly has its cause in disturbances from unconsidered air currents in the rooms where the measurements were made. For a velocity of jet of 200 fpm the value of the constant, according to Tuve, will be 4.5 and for a velocity of 100 fpm it will be 3.5. Rydberg and Norbäck[9] obtained a mean value of about 4.3.

In computations for air conditioning systems it should be possible as a reasonable mean value, to suggest the value 5 for the constant K_1 and then

$$\frac{V_m}{V_o} = 5\frac{d}{x} \dots (17)$$

if V_m and V_o are measured in the same units, and the same applies for d and x respectively.

The function given in Equation 16 is shown in Fig. 3 with experimental values taken from Zimm[2], Trüpel[3], and Cleve[4].

It will be seen from the foregoing that the angle of a circular jet is constant and amounts to approximately 35 deg.

The mean velocity in any cross section of the jet is about 0.2 V_m.

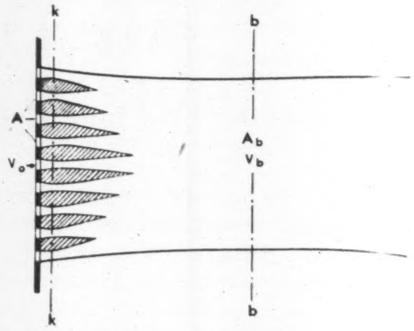

Fig. 4—Shape of jets leaving a grid

Air Discharge Through Grid

Fig. 4 shows in diagram a jet issuing through a grid. Model experiments made by Rydberg and Norbäck[9] have shown that immediately after the separate jets leave the grid a contraction takes place and the separate jets attain their greatest velocity in the section k — k, Fig. 4, from which the velocity is diminished through entrainment of surrounding air, and the separate jets unite quickly into one homogeneous jet. At a comparatively small distance from the grid, in the section b — b, Fig. 4, the velocity becomes uniform and almost constant throughout the whole cross section of the combined jet. Even if the grid is rectangular and the ratio between the longest and shortest sides is not too great, the jet in the cross section b — b, Fig. 4, has assumed a practically circular cross section. This was demonstrated by Tuve[8] and others. The section b — b lies at a distance x_b from the grid that is of the same order of magnitude as the longest dimension of the grid.

The following symbols are used

A = the free area of the grid (the total area of openings)
V_o = the velocity in the grid openings
A_k = the total area of the separate jets in section k — k, Fig. 4
V_k = the velocity of the separate jets in section k — k, Fig. 4
A_b = area of jet in section b — b, Fig. 4
d_b = diameter of jet in section b — b, Fig. 4
V_b = velocity of jet in section b — b, Fig. 4
V_m = velocity in center at distance x from the grid

α = coefficient of discharge for the grid.

In the section b — b, Fig. 4, the jet resembles a homogeneous jet that has just left a circular nozzle and the formulas for circular jets should apply to the jet in question beyond section b — b. Then (as per Equation 17)

$$V_m = 5 \frac{V_b d_b}{x - x_b} \text{..........} (18)$$

or, since

$$A_b = \frac{\pi d_b^2}{4} \text{................} (19)$$

$$V_m = 5 \frac{V_b}{x - x_b} \sqrt{\frac{4 A_b}{\pi}} \text{....} (20)$$

In the separate jets the pressure drops from the grid to the section k — k. Beyond the section k — k there first prevails a certain vacuum between the separate jets, but the pressure drop between sections k — k and b — b is insignificant and it is therefore possible to apply in this area the principle of momentum, which gives

$$V_k^2 A_k = V_b^2 A_b \text{............} (21)$$

Since x_b is usually small in comparison with x, the result, after eliminating V_b and A_b is

$$V_m = 5 \frac{V_k}{x} \sqrt{\frac{4A_k}{\pi}} \text{.........} (22)$$

If the coefficient of discharge for the grid openings is α, Equations 23 and 24 may be written

$$A_k = \alpha A \text{................} (23)$$

$$V_o = \alpha V_k \text{................} (24)$$

and therefore

$$V_m = 5 \frac{V_o}{x} \sqrt{\frac{4 A}{\pi \alpha}} \text{.........} (25)$$

For a circular opening in a thin wall, α is approximately 0.60. For a square opening in a thin wall, according to Tuve[8], $\alpha = 0.61$, and the same figure applies also for rectangular openings, if the ratio between the long and the short side is not too great. When that ratio grows, α increases, and for openings where the long side is 12 or 48 times the short side α becomes, according to the same source, 0.64 and 0.67 respectively. For grids, α assumes still greater values. Tuve gives for different types of commercial grids α—values from 0.72 and 0.87 with a mean of 0.8. For the grids investigated by Rydberg and Norbäck α was found to be 0.64. That the value for this type of grid was relatively low would seem to be due to grid construction employing circular, sparsely situated holes.

As a mean value for rough estimates, a value of $\alpha = 0.7$ seems reasonable.

With this value,

$$V_m = 6.7 \frac{V_o \sqrt{A}}{x} \text{..........} (26)$$

If air volume per unit of time $Q = V_o A$, is substituted for air velocity, Equation 27 is obtained

$$V_m = 6.7 \frac{Q}{x \sqrt{A}} \text{............} (27)$$

The constant 6.7 is dimensionless.

The two last formulas apply for free jets from concentrated discharge openings of rather indefinite form, *e.g.* circular or rectangular holes, grids of various constructions, etc. In grids the form of the holes or the distance between them does not matter. For grids made with guide vanes which give the air a special direction or have a diffusing effect, however, the formulas may not apply.

The same formulas apply for single openings and for grids because at the same time as there is obtained immediately on leaving the grid a dilution of the discharged air and thus a decrease of the velocity, there is also obtained an increase of the total area of the jet, which increase fully compensates for the decrease in velocity.

Temperature Distribution in Air Jets

For an air particle with velocity V in any point of the jet shown in Fig. 5, part of its mass is obtained from the air (of mass m) discharged with velocity V_o through the opening and the remainder is obtained from the still air (of mass m_o) surrounding the jet. If the pressure in the jet is constant and friction is ignored, the momentum of the arbitrarily selected air particle with the mass m + m$_o$ must be equal to the momentum of the particle m$_o$

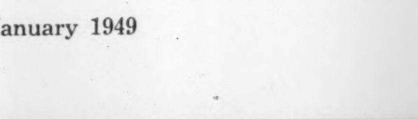

Fig. 5—Temperature and momentum of a particle in an air jet

$$m_o V_o = (m + m_o) V \text{........} (28)$$

If the temperature of the discharged air is t_o, the temperature of the room air is t_s, and if the temperature in the arbitrarily selected point in the jet is t, there is obtained, if heat exchange by conduction is ignored,

$$m_o t_o + m t_s = (m + m_o) t \text{....} (29)$$

If, in Equations 28 and 29, m and m_o are eliminated, Equation 30 is obtained

$$\frac{t - t_s}{V} = \frac{t_o - t_s}{V_o} \text{............} (30)$$

Equation 30 states that the ratio of the excess temperature (the difference between the temperature in the jet and the surrounding air) and the velocity is constant throughout the jet and equal to the same ratio computed for the outlet. This has also been confirmed experimentally[6].

By combining Equations 26 and 30

$$t_m - t_s = 6.7 \ (t_o - t_s) \frac{\sqrt{A}}{x} \text{..} (31)$$

where t_m = the temperature in the center of the jet at distance x from the outlet.

The Effective Temperature in An Air Jet

The effective temperature t_e for a given case with arbitrary values for the air temperature t, the wall temperature t_v, the dew point temperature t_d and the air velocity V, is defined as the temperature required in a space in order to have the same heat loss from the human body as in the case given, provided that in the space considered the air and wall temperature are equal, that the relative air humidity is 100 percent ($t_d = t$) and that the air velocity is equal to zero.

In a small temperature range it is possible to count on the effective temperature as varying rectilinearly with the air temperature, the wall temperature, the dew point temperature and the air velocity, and it is possible then, to write for the effective temperature in any point of the jet within a small temperature range,

$$t_e = At + Bt_v + Ct_d - DV \quad (32)$$

A, B, C and D are constants and $A + B + C = 1$. If the effective temperature for the still air outside the jet is designated t_e and the dew point temperature for the same air is designated t_d there is obtained

$$t_e = At_s + Bt_v + Ct'_d \quad (33)$$

The difference between the effective temperatures of the surrounding air and the jet, the effective temperature drop of the jet, will be

$$t'_e - t_e = A(t_s - t) + C(t'_d - t_d) + DV \quad (34)$$

Dividing Equation 34 by A

$$\theta = \frac{t'_e - t_e}{A} = (t_s - t) + \frac{C}{A}(t'_d - t_d) + \frac{D}{A}V \quad (35)$$

The quantity θ obtained in this manner is proportional to the effective temperature drop of the jet and differs from this only in that its scale is so selected that it coincides with the scale for the air temperature t.

The quantity θ indicates, in the first place, the direct difference between the real air temperature of the surroundings and of the jet. In addition, the air temperature difference, which in respect to cooling is equivalent to the difference in dew point temperature between the air of the room and the air of the jet, and finally the air temperature difference which concerns cooling effect, is equivalent to the air velocity in the jet.

To sum up, it may be said that θ indicates the difference between the room air temperature and the temperature of still room air which would be required to give the same cooling effect on the human body as the air jet. Thus, θ represents a kind of effective air temperature drop.

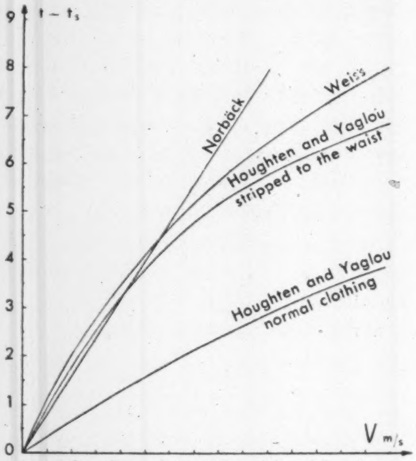

Fig. 6—Relation between air velocity and temperature drop required for feeling of equal warmth

Usually $(t'_d - t_d)$ is small. Only if large quantities of moisture in proportion to the volume of air are delivered to, or extracted from, the air in the room will the difference be of significance. Consequently in most cases the effect of humidity may be ignored, and,

$$\theta = t_s - t + \frac{D}{A}V \quad (36)$$

The constant in this equation may be determined empirically.

If $\theta = 0$,

then,

$$\frac{t - t_s}{V} = \frac{D}{A} \quad (37)$$

According to the foregoing, in an air jet the ratio given in Equation 37 between the excess temperature and the velocity is constant throughout the jet and equal to the same ratio at the outlet. If an air jet is so arranged that in the area where the velocity is low ($V < 200$ fpm) and where, therefore, Equation 32 may be considered applicable, the air temperature drop, θ, will be equal to zero, as may be shown by test. The value of the constant can be determined from data for the temperature and velocity of the discharged air[10].

Investigations of this nature for arriving at the value of the constant D/A have been carried out at the Technical University at Stockholm by Norbäck[11]. For these tests subjects were placed in a horizontal jet of hot air and the velocity and the excess temperature of the jet regulated so that the jet, according to statements by the subjects, caused the same temperature feeling as the surroundings. According to Equation 30, the ratio between excess temperature and velocity is constant in all parts of the jet and therefore it is of no consequence where the subject is placed in the jet, provided it is done in those parts of the jet where the deviations from the surroundings are small and thus Equation 32 is satisfied.

In Fig. 6 there is shown the relation obtained by Norbäck between the excess temperature $t - t_s$ and the air velocity V which gives $\theta = 0$, *i.e.,* freedom from draft. At the same time there is given in Fig. 6 the corresponding relation computed from experimental values given in tests by Houghten and Yaglou[12, 13, 14, 15, 16] and Weiss[17].

The proper relation, according to Fig. 6, should probably be represented by a slight curve, but for low velocities a rectilinear relation in the manner given earlier is satisfactory. The constant D/A will be approximately equal to 8, when the temperature is measured in Centigrade degrees and the velocity in meters per second (if the temperature is measured in Fahrenheit degrees and the velocity in feet per minute, the value of the constant will be 0.07).

The effective air temperature drop of the jet, in general, when the temperature is measured in Fahrenheit degrees and the velocity in feet per minute, is given by the following formula

$$\theta = t_s - t + 0.07V \quad (38)$$

For the center of a jet issuing from a grid or other single opening, if the foregoing is taken into account, there is obtained

$$\theta = 6.7\ (t_s - t_o) + 0.07V_o \frac{\sqrt{A}}{x} \quad (39)$$

As the greatest air velocities and temperature drops arise in the jet center, Equation 39 is usually sufficient for judging the possibility of draft.

By appropriate selection of the outlet area *A*, the distance *x* between the discharge openings and the zones where people are stationed, as well as the discharge air temperature t_o and the velocity V_o, it is obviously possible to attain a value for the effective air temperature drop of the jet, θ, that may be tolerated from the draft point of view. Sensitivity to temperature drops of this kind may vary. Norbäck's experiments suggest that generally an unfavorable reaction will be obtained if the value of θ exceeds 2 to 3 F deg. It is assumed that the temperature of the surrounding walls and the absolute humidity of the air are kept constant. By these last assumptions concerning the radiation conditions and air humidity the action of the effective temperature drop of the jet on the effective room temperature is diminished in its effect on the total heat loss from the human body.

Equation 39 is only applicable in zones where the air velocities are less than 200 fpm.

On the discharge of heated or cold jets, the gravitational forces give additional velocities which may cause considerable deviations from the isothermal jet course. In the formulas given no account is taken of this effect. Proper corrections can be made both for horizontal and vertical jets.

Freedom From Draft on Discharge of Hot Air

It is seen from the foregoing that freedom from draft, *i.e.*, $\theta = 0$, is attained if

$$\frac{t - t_s}{V} = 0.07 \quad \ldots\ldots\ldots\ldots\ldots (40)$$

Since the ratio between the excess temperature and the velocity is constant throughout the jet, this condition may be written

$$\frac{t_o - t_s}{V_o} = 0.07 \quad \ldots\ldots\ldots\ldots\ldots (41)$$

where, therefore, t_o and V_o are the Fahrenheit temperature and velocity in feet per minute in the discharge opening and t_s is the temperature of the surrounding still air in Fahrenheit degrees.

For hot air discharge, complete freedom from draft can be insured if the foregoing condition is fulfilled. In addition to the condition of Equation 41, there are other conditions that must also be met in practice. Difficulty in this respect, however, is not encountered as a rule. Usually the ventilation air required for an installation is given by

$$Q = A\, V_o\, c_p\, (t_o - t_s) \quad \ldots\ldots (42)$$

where

Q = the amount of heat required
A = the outlet area
c_p = the specific heat of the air.

The conditions of Equations 41 and 42 determine both the excess temperature of the discharge air and the velocity, if the area *A* is fixed. If *Q* varies, *e.g.*, with the season, then both excess temperature and velocity, *i.e.*, the air volume, must be capable of variation. One way of achieving the stated conditions without varying the air volume is to alter the area *A*. In most cases, however, this is not possible and, therefore, the air volume must be varied. If the fresh air volume is fixed, which is another common condition, the discharge air volume can still be varied at will, if circulating return air is mixed with it.

Minimum Draft for Cold Air Discharge

With discharge of cold air it is not possible to assure freedom from draft. The cooling action due to the air movement is in this case no longer compensated by an excess temperature in the jet but on the contrary is accentuated owing to the jet having, throughout its course, a lower temperature than the air of the room.

For the amount of refrigeration introduced by the discharge air into the premises per unit of time, Equation 43 applies

$$W = A\, V_o\, c_p\, (t_s - t_o) \quad \ldots\ldots (43)$$

If *A* is eliminated between Equations 39 and 43,

$$\theta = \frac{6.7}{\sqrt{c_p}} \; \frac{\dfrac{t_s - t_o}{V_o} + 0.07}{\sqrt{\dfrac{t_s - t_o}{V_o}}} \; \frac{\sqrt{W}}{x} \quad \ldots\ldots\ldots\ldots\ldots\ldots (44)$$

If, for a constant value of the refrigeration load *W*, θ is differentiated with respect to the quantity

$$\frac{t_s - t_o}{V_o}$$

$$\frac{d\,\theta}{d\left(\dfrac{t_s - t_o}{V_o}\right)} = \frac{6.7}{\sqrt{c_p}} \; \frac{\dfrac{t_s - t_o}{V_o} - 0.07}{2\left(\dfrac{t_s - t_o}{V_o}\right)^{3/2}} \; \frac{\sqrt{W}}{x} \quad \ldots\ldots\ldots\ldots\ldots\ldots (45)$$

Inserting the derivative = 0, the condition for minimum value of θ is obtained (temperature in Fahrenheit degrees and velocity in feet per minute)

$$\frac{t_s - t_o}{V_o} = 0.07 \quad \ldots\ldots\ldots\ldots\ldots (46)$$

When the refrigeration load is given and constant, and if the foregoing condition is fulfilled then θ obtains a minimum value, *i.e.* the feeling of draft for a person who encounters the jet will be the smallest possible.

This can also be expressed so as to show that, for a given admissible value for the feeling of draft, the throw of the jet has a minimum.

As stated, it is only if the refrigeration load is constant that a minimum is obtained. This condition of constant refrigeration load is almost always obtained in practice. The refrigeration load may be allowed to vary, *e.g.*, with the season, and the only requirement is that at any given time there shall be a given refrigeration load. As the refrigeration load itself does not enter into the condition for minimum, this condition has the same form for different occasions with different refrigeration loads, even if the values comprised for temperature drops and velocity do vary.

It will be seen from Equation 44 that θ increases with increasing value for the refrigeration load *W* and that it decreases with increasing *x*.

To assure that the draft in a given case shall be as small as possible, it is evident that the refrigeration *W* should be brought down to the lowest possible value (if in this connection the geometric shape of the premises, of which it is not possible to make a general statement, is ignored). After *W* has been fixed at as low a value as possible, the most favorable result is obtained if the minimum condition given is fulfilled.

The reason why a minimum is obtained is that if the difference of temperature selected for a certain definite refrigeration load is small, then the air volume must be made large, and then the velocity or inlet area will be large and the jet will have a long throw. If on the other hand a large temperature difference is taken the jet will be cold and will cause great cooling effect, even if the velocity is small.

If the inlet area *A* is given, the temperature drop and velocity of the discharge air are determined by Equations 43 and 46. If the refrigeration load *W* varies from time to time, *e.g.* with the season, the foregoing data for discharge air must be varied accordingly, if a minimum of draft is to be assured.

If there is also a demand that the fresh air volume be adaptable to requirements, *e.g.*, dependent on the occupation of the premises, this demand can be met if the area *A* be made variable. Usually *A* cannot be altered and then there remains only the possibility of varying the discharge air volume irrespective of the fresh air volume by mixture with circulating return air. It is therefore possible, by employment of return air, to obtain a minimum of draft also in the general case, when both the refrigeration load and the fresh air volume are given for each occasion, but can be altered irrespective of each other.

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SAFE USE OF FIBER GLASS

Safe use of fiber glass in industry is the subject of the following report by John Silson, M.D., in the *Monthly Review* of the New York State Department of Labor, Division of Industrial Hygiene and Safety Standards.

Fiber glass consists of fine flexible glass fibers which are either woven into fabrics or fabricated into bats, blankets or sheets. In processing this material, complaints of skin irritation are sometimes encountered.

This irritation is due to the physical effects of the sharp ends of the glass fibers and not to any toxic properties of the material. It is characterized by itching erythema and occasionally pinhead-sized papules similar to prickle heat. It is transitory and usually disappears after a few days as the worker becomes conditioned to it, provided certain controls in handling it are maintained. Extensive animal and human experimentation has shown that there are no prolonged or toxic effects to the skin and no pulmonary reactions whatsoever. No sensitization to the material has ever been demonstrated. . . .

Conclusions—Fiber glass is a material which causes transient irritation of the skin but no systemic or toxic effects and can be safely handled with proper hygiene.

Recommendations—(1) All workers handling material should wear loose one-piece cover-alls with no constricting neck bands, belts, wrist or ankle cuffs. Long sleeves are not necessary unless indicated for warmth. These uniforms should be laundered frequently and are preferably supplied by the employer, in order to insure proper design and adequate laundering.

(2) Locker rooms and adequate washing facilities, including showers, should be provided for all workers handling this material. A separate place for hanging their work-clothes should be provided so that they will not contaminate their street clothes by use of the same lockers. A cleanser containing a wetting agent (like Lan-O-Kleen or p H 6) is helpful in removing fibers that cling to the skin.

(3) A soothing lotion, such as calamine, with one percent phenol should be made available to the workers to allay any irritation present after washing.

(4) No respirators or impermeable clothing are necessary. Gloves should be avoided unless necessary because of cold working conditions. Goggles are required only when handling the material overhead to prevent particles from falling into the eyes.

(5) Scrupulous house-cleaning should be maintained with frequent vacuuming of the work areas. No dry sweeping should be allowed. Covered bins should be maintained for depositing all waste material. Good natural ventilation is essential but no special local exhaust ventilation is required unless indicated for a similar operation on any other non-toxic material, as for example, in sawing bats or sheets.

The Stevens Hotel, scene of the meeting, overlooks famed Michigan Ave.

Heating, ventilating and air conditioning equipment will be on display at the International Amphitheatre

The Merchandise Mart will be the scene of a breakfast and conducted tour for the ladies

In Chicago—

55th Annual Meeting

January 24-27
Stevens Hotel

9th International Heating and Ventilating Exposition

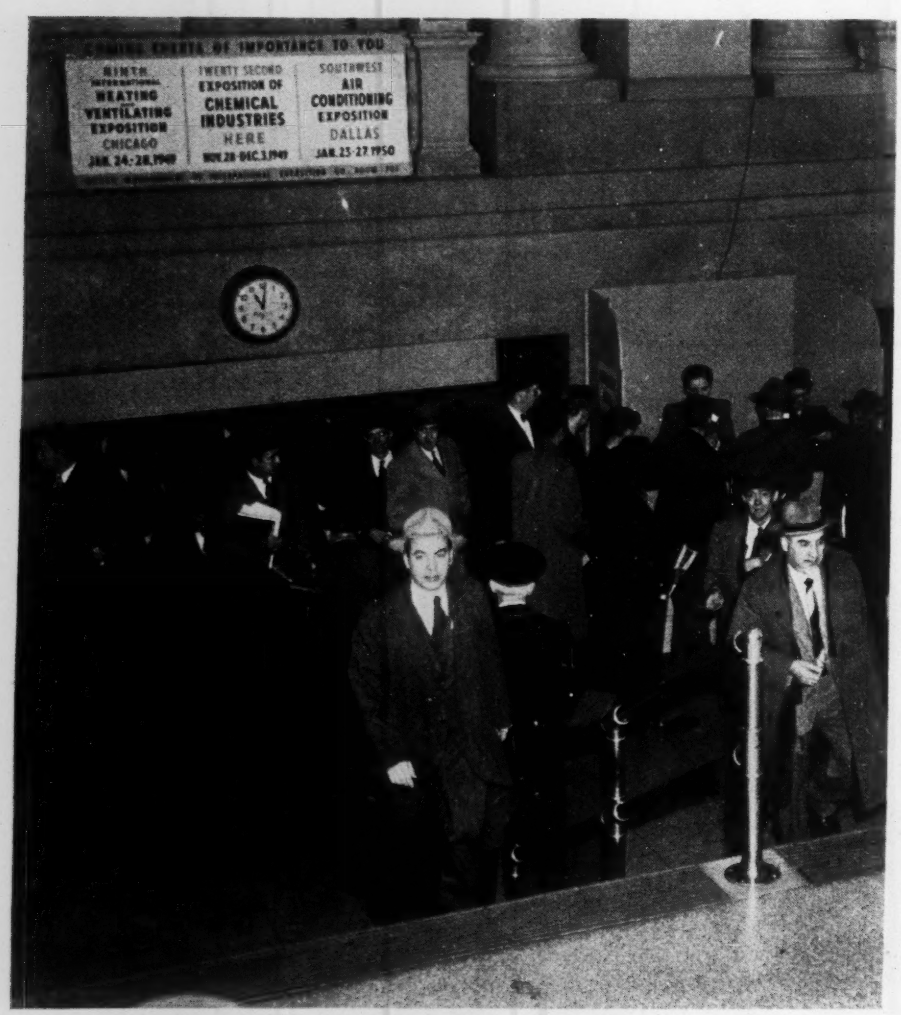
January 24-28
International
Amphitheatre

For complete details, see special Show Section, in this issue

Getting Up Steam at the Power Show

Of four hundred exhibits at the National Exposition of Power and Mechanical Engineering, the new packaged steam generators were of special interest to heating and ventilating engineers. The first national power show since 1946, the exposition of November 29 to December 4, 1948 covered four floors of Grand Central Palace, New York City, and included steam boilers of eight different companies, ventilating units and heaters, and many other products.

Savings on fuel, compactness of the unit, economical installation and smokelessness were features of the steam generators, which guaranteed at least 80 percent thermal efficiency and stressed fully-automatic or semi-automatic operation. Combustion of oil or gas was also provided for by combination units or standby conversion burners. Sizes ranged from 10 to 300 hp, with pressures of 15 to 200 psi. Another feature was the use of small flues or vent pipes, with no necessity for large stacks. The generators were said to be capable of providing workable steam within 5 to 10 min after a cold start.


COMING EVENTS OF IMPORTANCE TO YOU
NINTH INTERNATIONAL HEATING AND VENTILATING EXPOSITION
CHICAGO
JAN. 24-28, 1949
TWENTY SECOND EXPOSITION OF CHEMICAL INDUSTRIES
HERE
NOV. 28-DEC. 3, 1949
SOUTHWEST AIR CONDITIONING EXPOSITION
DALLAS
JAN. 23-27, 1950

The 9th International Heating and Ventilating Exposition was announced to New York Power Show visitors

The Powermaster, a floor exhibit of Orr and Sembower, Inc., Reading, Pa., was a self-contained automatic boiler with built-in feed water and condensate system. The Clayton Steam Generator of New York Steam Generator Sales Co. was in actual operation at the show. Cyclotherm, by Cyclotherm Corp., New York City, used the cyclonic combustion principle. The Superior Steam Generator of Superior Combustion Industries, Inc., New York, was equipped with a horizontal rotary burner, the latter being exhibited separately as well.

Other steam generators exhibited were: Amesteam Generator, made by Ames Iron Works, Oswego, New York; the Econotherm, C. H. Dutton Co., Kalamazoo; and the Preferred Unit Steam Generator of Preferred Utilities Mfg. Corp., New York City.

A type of boiler different from the others was the Speedylectric steam generator demonstrated by Livingston Engineering Co., Boston. It produces steam by electric current which is passed between two electrodes immersed in water. A compact unit, it occupied a floor space of 16 x 30 in., but larger boilers were mentioned as being available. Safety features, such as no dry boiler risks and no flame hazard, were pointed out by the exhibitors.

The air conditioning and heating manufacturers who displayed units were the Niagara Blower Co. and L. J. Wing Mfg. Co., both with offices in New York City. American Blower Corp., Detroit, manufacturer of fans and air conditioning equipment, exhibited its gyrol-fluid-drive. Niagara had a fan heater utilizing high pressure steam and also exhibited its No-Frost method for cold room conditioning. L. J. Wing demonstrated a revolving unit heater with a fan driven by a two-purpose turbine supplying steam for both the fan and the heater section.

Various controls, valves, meters, traps and gages were exhibited by many firms, among which were the following companies: Clark Manufacturing Co., Cleveland; Leeds and Northrup Co., Philadelphia; Kaye and McDonald Inc., West Orange, N. J.; Allen-Bradley, Milwaukee, Wis.; Sarco Co. Inc., New York City; Equipoise Controls Inc., Mt. Vernon, N. Y.; Bailey Meter Co., Cleveland, Ohio; Wright Austin Co., Detroit, Mich.; Yarnall-Waring Co., Philadelphia; and Ward Leonard Electric Co., Mt. Vernon, N. Y.

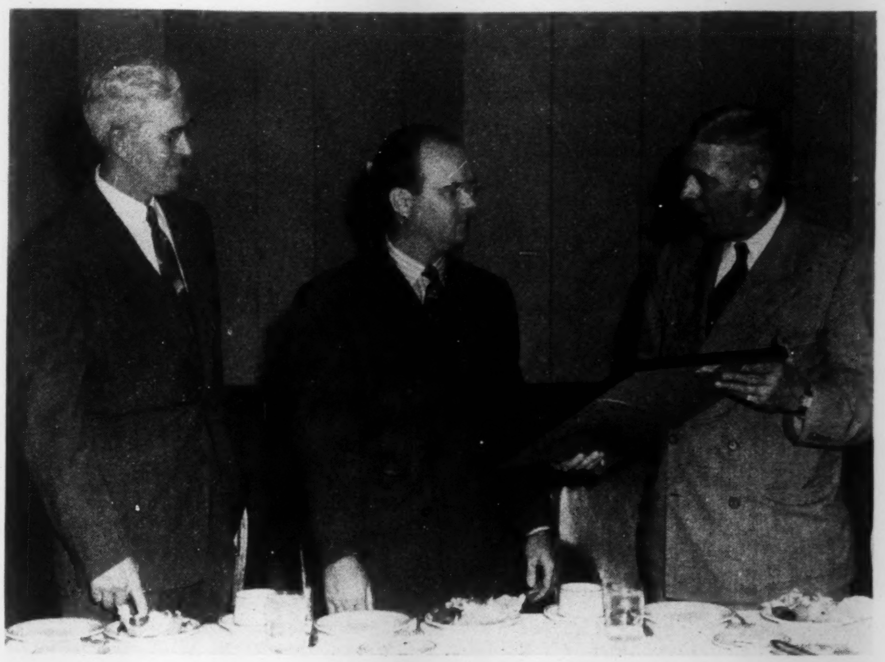
Oil burners included a floor exhibit of a utility burner by Stoddard Products Co., Inc., New Haven, Conn. This was a self-contained unit as applied to a small, temporary, high temperature furnace. W. N. Best Combustion Equipment Co., Inc., Carlstadt, N. J., showed some of its Calorex oil-burning equipment.

The exhibit of the General Power Plant Corp., N. Y.—Robot-Eye—was an electronic combustion control for oil burners used in apartment houses, office buildings, etc. Automatic controls shown by the Mercoid Corp., Chicago, included some used in connection with heating and ventilating equipment. On exhibit by Allis-Chalmers Mfg. Co., Milwaukee, were several motors adaptable to indoor and outdoor use in many industries.

Among many materials on display were asbestos and magnesia insulating materials, and insulated pipe units by Johns-Manville, New York; George P. Reintjes Co., Kansas City, Mo.; Keasbey & Mattison Co., Ambler, Pa.; and the Ric-wiL Co., Cleveland, Ohio.

The American Brass Co., Waterbury, Conn., showed the heat transfer properties of copper. Application of copper tubing to radiant heating was demonstrated by another Waterbury firm, the Chase Brass & Copper Co. Owens-Corning Fiberglas Corp., Toledo, Ohio, displayed insulation for ceilings, walls and attics of homes.

On the Advisory Committee of this 18th National Power Show were G. L. Tuve, President, and Homer Addams, past president, of ASHVE.

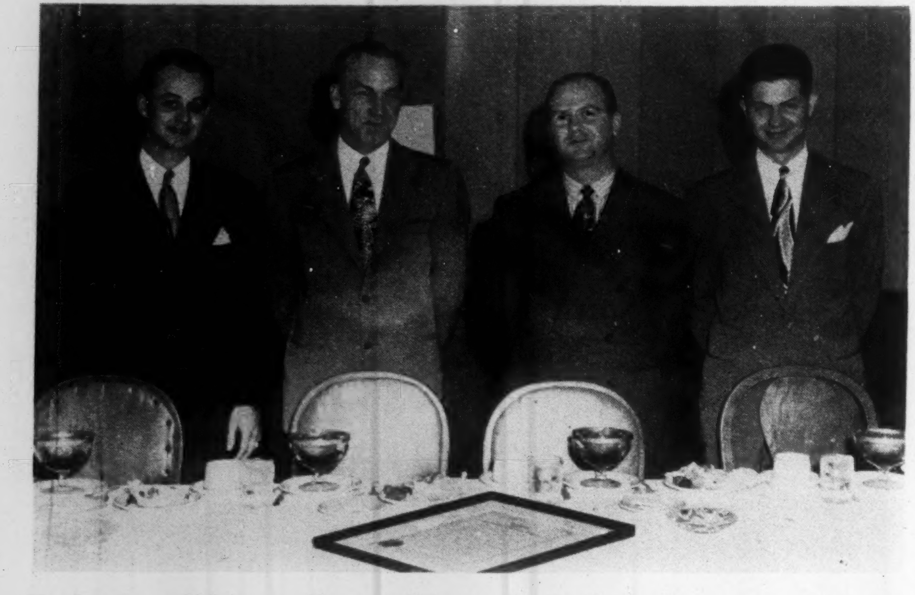


R. F. Taylor presents Northeastern Oklahoma Chapter Charter to President W. R. Lee, Prof. G. L. Tuve, president of ASHVE, looking on

NEW CHAPTER ORGANIZED AT TULSA

On October 5, members and guests gathered in the Exhibit Room of the Hotel Tulsa, Tulsa, Okla., for the charter meeting of the Northeastern Oklahoma Chapter of the Society. Following dinner the meeting was called to order by Pres. W. R. Lee, who introduced the other officers. A. D. Holmes, *vice president;* J. Neal Watt, *treasurer;* and Richard F. Shoemaker, *secretary*. Mr. Holmes then introduced the honored guests, G. L. Tuve, Cleveland, Ohio, president of the Society and professor at Case Institute of Technology; R. F. Taylor, Houston, Tex., chairman of the Society's Membership Committee;

D. M. Allen presenting Chapter Record Books to Secretary R. F. Shoemaker with President Tuve and W. R. Lee looking on



Northeastern Oklahoma Chapter Officers—R. F. Shoemaker, ***secretary;*** **A. D. Holmes,** ***vice president;*** **W. R. Lee,** ***president;*** **and J. N. Watt,** ***treasurer***

D. M. Allen, Kansas City, Mo., chairman of the Society's Chapter Relations Committee; C. Rollins Gardner, Dallas, Tex., chairman of the Society's Chapter Delegates Committee; and A. V. Hutchinson, New York, N. Y., secretary of the Society.

Congratulatory letters and telegrams from many chapters on the inception of the Northeastern Oklahoma Chapter were then read, following which the minutes of the preliminary meeting on September 23 were approved.

Mr. Lee announced the appointment of a nominating committee consisting of L. S. Reagan, *chairman;* Ross Brown, W. C. Roads, J. N. Watt and R. E. Pauling. Following the announcement of the personnel of the program, and meeting and entertainment committees, it was announced that all present at this meeting of the chapter were accepted by acclamation as Charter members, that charter membership in the chapter will remain open for 60 days, and that Chapter by-laws were being drafted and would be discussed and finally adopted.

President Tuve was introduced by President Lee, and his topic was, Our Society—Past, Present and Future, which consisted of a brief resumé of the history of the ASHVE, and at the conclusion Mr. Taylor presented the Chapter Charter to President Lee and gave a report on the Society membership. Following this Mr. Allen presented the Chapter Record Book to Mr. Shoemaker, the secretary. President Tuve then introduced Mr. Gardner, who reported on the Society meetings scheduled for the future. A general question and answer period followed, and the charter meeting of the Northeastern Oklahoma Chapter was brought to a close.

*Summary of Local Chapter Meetings**

Atlanta—November 5, 1948. The November meeting of the Atlanta Chapter was called to order by Pres. L. L. Barnes. The nominating committee reported the 1949 slate.

H. King McCain reported on the Research Expansion Program and W. J. McKinney proposed that members expecting to attend the Society's Annual Meeting in Chicago in January travel in a group.

J. J. O'Shea, program chairman, introduced Alfred E. Stacey, Jr., Syracuse, N. Y., first vice president of the Society, who gave an interesting talk on the organization and history of the ASHVE before addressing the members on Engineering and Economic Mobilization. Attendance 50. Attendance ratio 0.50.

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Central New York—November 18, 1948. The meeting was held at Howard Johnson's Restaurant, Syracuse, with Pres. D. L. Mills presiding. President Mills reported briefly on Society activities, followed by a report by L. E. LaRow, who announced that L. E. Seeley, dean of the College of Technology, University of New Hampshire, Durham, N. H., would be the guest speaker at the December meeting. E. P. Palmatier, project engineer, Research Department, Carrier Corp., Syracuse, talked on the Commercial and Residential Heat Pump, which he presented in an interesting manner. He gave comparisons on design considerations and owning and operating costs of conventional heating systems. The meeting was thrown open to discussion following Mr. Palmatier's talk and the audience reflected its interest in the many questions asked. Attendance 48. Attendance ratio 0.53.

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Central Ohio—October 18, 1948. Vice Pres. D. A. Norman, Jr., presided at the October meeting in the Chittenden Hotel, Columbus, and R. M. Keatts, chairman of the program committee, announced that the November meeting would be a joint meeting with the Columbus Technical Council. A diamond studded past president's pin was presented to H. R. Allonier in recognition of his services to the Chapter.

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* Note: The attendance ratios shown represent the membership attendance divided by the chapter membership. These ratios will be useful as a partial indication of interest shown by local chapter members in various types of subjects programmed by the various chapters and may be useful in deciding on subjects for chapter meetings.

Carl F. Boester, Lafayette, Ind., member of Council, spoke on the subject of Reverse Cycle Refrigeration. He prefaced his remarks with the suggestion of cooperation by every member of the Society in the activities of the ASHVE. He then discussed many of the possible ways of installing heat pumps with air, ground or water as the source of heat. He also described an installation using a gas engine to drive a heat pump. Electrical resistance heating using foil strip was briefly covered by Mr. Boester, and at the conclusion of his talk, a lively question and answer period followed. Attendance 38.

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Cincinnati—October 5, 1948. The Engineer's Club was the meeting place for the October meeting of the Cincinnati Chapter, and M. E. Mathewson, president, presided.

W. O. Entenmann, assisted by Walter Bartel, both of the Ric-wiL Co., gave an interesting talk on District or Central Station Heating. The talk was illustrated with slides showing many large installations, and Mr. Entenmann pointed out that many large cities were adopting district heating systems. Mr. Bartel handled the discussion in a very effective manner and both speakers were given a rising vote of thanks. Attendance 32.

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Connecticut—November 18, 1948. At a meeting held at the Union League Club, New Haven, L. E. Seeley, Dean of the College of Technology, University of New Hampshire, Durham, N. H., and treasurer of ASHVE, gave a very interesting talk on What Kind of a Society Do We Want. Dean Seeley's talk provoked many good questions and the members were unanimous in their thanks to him for bringing to them a discussion of Society problems and possible solutions. The program chairman announced that the next meeting would be on January 20 at the City Club, Hartford, with Insulation as the topic of discussion.

The nominating committee was elected as follows: E. R. Clement, *chairman;* H. J. Blakeley, F. A. DeLucia, W. A. Johnson, and R. W. Sidbury. Attendance 51. Attendance ratio 0.26.

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Golden Gate—November 4, 1948. The Golden Gate members met at the Engineers Club, San Francisco, for their monthly meeting, and H. V. Hickman, president, presided. The program chairman outlined details of Ladies Night scheduled for December 2.

The speaker of the evening, William Knowles, Air Filter Sales and Service Co., pointed out typical errors made by operators of plants that have filter banks and their apparent misunderstanding of the use of filters and their maintenance. After a lively discussion period, the meeting adjourned at 8:45 p.m. Attendance 51. Attendance ratio 0.32.

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Illinois—November 8, 1948. Economies Without Sacrifice was the subject discussed by S. R. Lewis, past president of the Society and consulting engineer, Chicago. His talk provided the Chapter with one of its most lively meetings and the largest attendance of the year.

Mr. Lewis compared the relationship to the heating, ventilating and air conditioning industry of inflationary trends following World War I and the present post-war period.

Current construction costs were analyzed in an effort to determine responsibility, with consideration given to each phase, such as engineering design, equipment, labor, etc. To eliminate the disadvantages of the *escalator clause,* Mr. Lewis offered a system of bidding. He recommended that competitive bids be furnished by the contractor covering overhead profit and participation. An agreement on an estimated price would be necessary for budget purposes. The work would be carried out on cost of material and labor, and the competitive percentages would be added. He stated that if the ultimate cost should prove less than the estimated price, the participation bid would take effect and the saving would be divided between the owner and the contractor. If the final cost should be greater, the owner and contractor would again share this difference.

Current high prices related to present political tendencies, as well as the aforementioned reasons, Mr. Lewis fears, may result in poorly designed and in some cases unsafe mechanical systems. Attendance 168. Attendance ratio 0.37.

•

Indiana—October 22, 1948. Pres. P. R. Jordan called for brief reports from the committee chairmen, and then called upon D. M. Long, secretary of the Purdue Student Branch, who advised that the Student Branch has formed a placement committee and is anxious to have the Indiana Chapter supply them with a list of prospective employers together with the type of employment that will be available. President Jordan announced the appointment of a committee to work with the Student Branch placement committee.

President Jordan turned the meeting over to W. E. Goohs, who introduced the speaker of the evening, Robert Beckman, Allison Division of General Motors Corp., who gave an extremely interesting talk on Breaking Through the Barrier. Mr. Beckman's talk centered about the new jet engines, particularly on the problems encountered in the development of these engines, operating at super-sonic speeds. An interesting discussion followed Mr. Beckman's formal presentation. Attendance 38.

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Iowa—November 9, 1948. Pres. D. C. Murphy presided and appointed the following committees for the coming year: *Membership*—H. W. Holbrook, *chairman,* R. W. Booth, M. E. Gould, W. E. Burch, F. E. Triggs; *Program*—D. E. Wells, P. R. Duitch, R. S. Stover, C. H. McGuiness; *Legislative*—C. A. Wheeler, Perry LaRue, J. F. Sandfort; *Dinner and Entertainment*—C. A. Wheeler, C. W. Helstrom.

President Murphy also mentioned the possibility of having a research committee to check reports from Society headquarters and report at each Chapter meeting.

A committee was formed to take care of arrangements for the Air Conditioning Conference at Iowa State College.

President Murphy was selected as ASHVE Iowa Chapter Delegate with D. E. Wells as Alternate.

The secretary was instructed to send greetings to W. R. Lee, Tulsa, Okla., president of the newly formed Northeastern Oklahoma Chapter.

Prof. Nathaniel Glickman, physiologist, Aero-medical and Atmospheric Environment Unit, Department of Medicine, University of Illinois Medical School, Chicago, gave a very interesting talk on Physiological Adjustments of Normal Subjects and Cardiac Patients to Sudden Changes in Environment. Using graphs and tables, Professor Glickman explained the effect of sudden temperature changes on various types of people, and gave a complete description of the experiments used to obtain the information on which his talk was based. The accurate control of temperature and humidity in the experimental rooms showed how air conditioning and ventilation affected this work. Attendance 27. Attendance ratio 0.50.

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Kansas City—November 1, 1948. Pres. H. E. Gould presided at a meeting held in the Pine Room of the Union Station. E. L. Smith, chairman of the Technical Advisory Committee, reported briefly on the activities of the ASHVE Committee on Research.

E. K. Campbell gave a final report on the smoke committee and pointed out that as a result of the committee's activities the smoke ordinance had been passed and was working satisfactorily.

John Howatt, past president of the ASHVE and chief engineer, Board of Education, Chicago, was introduced by Mr. Campbell as the speaker of the evening. Mr. Howatt gave a very interesting talk on Our Society, Past, Present and Future. He outlined the steady growth of the ASHVE in membership and activities, including publication of THE GUIDE and TRANSACTIONS. Mr. Howatt described in detail the program of the Committee on Research and gave those present a greater understanding of Society activities. At the conclusion of his talk, Mr. Howatt invited Kansas City members to attend the ASHVE 55th Annual Meeting in Chicago in January 1949. Attendance 46. Attendance ratio 0.25.

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Manitoba—October 21, 1948. The October meeting was held at the Fort Garry Hotel, Winnipeg, and W. W. Moss, vice president, presided. A moment of silence was observed in respect to the memory of the late William Worton, a member of the Manitoba Chapter who passed away on September 23. Vice President Moss announced that President Stephenson had been accepted as the representative of the Chapter to assist the Society's Committee for the Promotion of Research. A resumé of the committee's purpose was given and the suggestion made that any Chapter members having a project in mind should submit a definite outline of such a project to the Board of Governors.

As the featured speaker of the evening, Cam Bower, Imperial Oil Co., Ltd., was introduced, and after a short explanation, showed the film in technicolor, Search Un-Ended, depicting the activities of geographical, geophysical, and aerial photographic survey crews in the attempt to find possible petroleum fields and the drilling of wells to locate actual deposits. Attendance 23. Attendance ratio 0.62.

Massachusetts—October 19, 1948. The October meeting of Massachusetts Chapter was opened by Pres. R. T. Kern in Room 3-270, Massachusetts Institute of Technology, Cambridge.

Results of the questionnaire regarding meeting subjects, location and features were announced and will help in planning future programs.

It was reported that, as a result of writing to all ASHVE members who reside in Massachusetts and who were not members of the Massachusetts Chapter, 15 new members were elected. The Chapter now has 104 members.

A. C. Bartlett, manager, Heating and Ventilating Department, Westinghouse Electric Corp., Sturtevant Div., spoke on A Method of Fire Control. Illustrating his talk with lantern slides, he discussed a method of controlling fires in multi-story buildings where moving stairways are used. This method includes the use of fans and duct work as well as sprinkler systems. Mr. Bartlett described the experimental building where tests were made to determine the best type of system and outlined the basis of design and the equipment used.

R. C. Corson, engineer, Construction Laboratory, Associated Factory Mutual Fire Insurance Companies, attended as a guest and took part in the discussion which followed the talk. Attendance 25. Attendance ratio 0.24.

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Michigan—October 11, 1948. Immediately following the opening of the meeting by Pres. E. F. Hyde, the speaker of the evening, Lester T. Avery, Cleveland, Ohio, second vice president of the Society, and president of Avery Engineering Co., was introduced. Mr. Avery delivered a special message from the Society, speaking at the request of Pres. G. L. Tuve. His message covered subjects under current consideration by Society officers and was presented in an effort to keep all chapters informed on current problems. He outlined some of the more important points, such as appointing a public relations officer, and appointing a special editor to condense JOURNAL reports to allow more such reports to be published. He also spoke on the increase of the Society dues, and made a special request for Chapter Delegates to report to each Chapter on research activities. Mr. Avery also called attention to the Annual Meeting and the International Heating and Ventilating Exposition scheduled for the fourth week in January in Chicago. A general meeting followed Mr. Avery's interesting talk.

J. F. McIntire, past president of the Society, was awarded a Life Membership Certificate in the Society and spoke a few words of appreciation, stressing the great value received from the ASHVE as compared to other professional societies. Leo Collins reported on his duties as a delegate from the Society to the *ASTM* meeting in Detroit. President Hyde reported that Mrs. A. E. Knibb donated two rolls of film taken by Mr. Knibb, and it was decided that this would be the beginning of a Ted Knibb Memorial.

Mr. Avery then delivered an interesting address covering a review of new products, particularly during and since the war years, which have been possible only through process air conditioning. Mr. Avery's practical experience in this field gave added interest to his talk. He illustrated his points by slides and actual small samples of various products. At the conclusion of his talk, he was given a rising vote of thanks. Attendance 93.

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Minnesota—November 1, 1948. Pres. O. L. Lilja called the second meeting of the year to order in the East Room of the Curtis Hotel, Minneapolis. L. J. Krause, in the absence of E. F. Snyder, secretary, read the minutes of the October meeting. R. C. Jordan announced the forthcoming meetings and stated that the January meeting would be a joint meeting with the Twin City Chapter of the *ASRE* and the speaker would be E. R. Ambrose, American Gas and Electric Service Co., New York, N. Y., who would address the meeting on the topic of Heat Pumps.

President Lilja announced that the 1949 Semi-Annual Meeting of the Society has been definitely scheduled for Minneapolis. D. B. Anderson was announced as alternate to the Annual Meeting in January in Chicago.

The speaker of the evening, Prof. Frank B. Rowley, past president of the Society and Director, Engineering Experiment Station at the University of Minnesota, gave an interesting talk on the important subject of Vapor Transmission and Condensation Problems. His down-to-earth presentation with slides was thoroughly enjoyed and appreciated by the members and guests. A ten minute question and answer period followed. Attendance 103.

Minnesota—October 4, 1948. The first meeting of the season was called to order by President Lilja, who introduced the guests of the evening as well as two new members of the Chapter. B. F. McLouth submitted his report as treasurer, and Professor Jordan reported for the program committee. Following a report on membership by G. M. Kendrick, John Haines gave a report on the plans for the Semi-Annual Meeting scheduled for Minneapolis.

President Lilja introduced the honored guest, S. R. Lewis, Chicago, Ill., who spoke at some length on the subject of Snow Melting Systems. Mr. Lewis gave a very interesting talk, interspersed with a great many personal anecdotes, and gave considerable information which should prove very helpful in the design of this type of heating system. Mr. Lewis answered a number of questions at the close of his talk and the meeting was adjourned at 9:25 p. m. Attendance 88. Attendance ratio 0.41.

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Montreal—November 15, 1948. At the November meeting of the Montreal Chapter, held at the Berkeley Hotel, Pres. Leo Garneau presided. S. W. Salter introduced the guests who were present.

The treasurer, W. G. Hole, requested payment of Chapter dues and President Garneau announced the Christmas meeting, stating that it would also be Past Presidents' Night when the past presidents' pins would be presented.

F. G. Phipps, vice president, Preston-Phipps, Inc., Montreal, gave a very able talk on Pneumatic Ash Conveyors, based on his many years of experience. He illustrated his talk with a moving picture indicating various types of installations. Attendance 61.

Montreal—October 18, 1948. The October meeting was held at the Berkeley Hotel, Montreal, with Pres. Leo Garneau presiding. The regular order of business was followed by the reading of the minutes of the May meeting, which were accepted as read, and K. W. Hole, treasurer, discussed the Chapter balance sheet. A. B. Madden moved that the report be accepted and the motion was seconded by H. G. S. Murray. B. J. Horsburgh gave his report on the golf tournament and indicated that the curling trophy would be purchased from the surplus funds of the two golf tournaments.

L. E. Seeley, treasurer of the Society and dean of the College of Technology, University of New Hampshire, Durham, N. H., was then introduced as the guest of the evening. Dean Seeley addressed the meeting on the subject, What Kind of a Society Do We Want? After his talk there was a lengthy discussion with regards to membership, also some discussion on the possibility of the Society establishing various standard codes. S. W. Salter expressed appreciation to Dean Seeley on behalf of the Chapter. Attendance 40.

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Nebraska—November 11, 1948. Pres. K. R. Magarrell introduced the guest speaker who discussed the general use of hot water heating systems, including domestic and commercial applications, followed by a discussion on general heating systems. Attendance 31.

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North Texas—October 18, 1948. B. S. Foss, Jr., called the meeting to order at the Melrose Hotel, Dallas, and the minutes of the August and September meetings were read and approved. J. P. Ashcraft reported on the Christmas party scheduled for the third Monday in December, and C. Rollins Gardner reported on the arrangements for the 1950 Annual Meeting of the Society, planned for Dallas. He also announced that the Texas Special Train for the Annual Meeting in Chicago needed more reservations, although enough reservations had been made to assure a special train, through the help of Houston and other points. Oslin Nation reported on the current status of the membership.

L. S. Gilbert introduced the speaker, N. P. Green, Water Cooling Equipment Co., who spoke on the Induced Draft Tower, Application, Design and Performance. Mr. Green answered a number of questions during the discussion, and the meeting was adjourned at 10:35 p. m. Attendance 63. Attendance ratio 0.54.

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Northern Ohio—November 8, 1948. W. R. Moore, president, presided at the November meeting in the Warner Auditorium of the Cleveland Engineering Society Building. R. L. Byers reported on the progress of the roster, and R. E. Sherman presented his report as treasurer. R. W. Dickson, Jr., reported as chairman of the membership committee, and G. P. Nachman announced that no further City Council action had been taken on the new code and that a first draft of new regulations on boiler installations has been completed by the Smoke Abatement authorities. Cyril Tasker reported that the mortgage on the Laboratory building was to be liquidated in December of this year, and that expansion of the research program was proceeding at a rapid pace.

T. D. Dravage of the program committee introduced Carl F. Boester, Lafayette, Ind., member of Council who spoke on Reversed Cycle Refrigeration and Radiant Heating of Small Homes. Mr. Boester's talk dealt with research work being conducted on the heat pump in a test house on the Purdue campus, with comments on his findings on applications of the heat pump principle in various parts of the country. Attendance 110. Attendance ratio 0.94.

Northern Ohio—October 11, 1948. G. P. Nachman reported that the warm air section of the new city code has been approved by the City Council, and that the light and ventilation section of the code has been completed, but that there is still some discussion regarding fees. L. S. Ries reported for the auditing committee on the financial records and announced that the treasurer's final report had been approved.

E. O. Young of the program committee introduced the speaker, Prof. G. L. Tuve, president of the Society and professor of mechanical engineering at Case Institute of Technology, Cleveland. Professor Tuve, before beginning his talk on the subject of Professional Air Control —1960, reported on his recent travels on behalf of the Society, and announced the formation of a new chapter at Tulsa, Okla. His talk covered work being done at Case on air distribution, the findings to date, and concluded with ten predictions on the future developments of heating and air conditioning systems with respect to health, air sterilization, quietness, minimum of maintenance, fuels, etc. Attendance 85.

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Oklahoma—November 8, 1948. J. H. Spaan, Jr., president, presided at the meeting held in Beverly's Drive-In, Oklahoma City. Announcement was made of the plan of the Texas Chapters to have the Oklahoma Chapter members arrange for a special car to take the members to the Annual Meeting and Exposition in Chicago in January.

The guest of the evening, J. F. Macpherson, district motor specialist of General Electric Co., was introduced, and his talk pertained to electric motors and controls as applied to heating, ventilating and air conditioning equipment. He was assisted by Al Taylor, Oklahoma City representative for General Electric Co. A lively discussion followed. Attendance 45.

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Ontario—November 1, 1948. The Ontario members met at the Royal York Hotel for their November meeting and Pres. E. G. Spall presided. Leo F. Collins, chemical engineer, The Detroit Edison Co., Detroit, Mich., spoke on Diagnosing and Correcting Corrosion Troubles in Steam Heating Systems. He illustrated his talk with slides, and a lengthy discussion followed. Attendance 90. Attendance ratio 0.40.

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Oregon—November 4, 1948. Nineteen members of the Pacific Northwest Chapter, led by their president, L. L. Bysom, journeyed 200 odd miles on November 4 to a joint meeting with the Oregon Chapter, returning the visit made by the Oregonians in January, 1948. The visit was the first by the Pacific Northwest Chapter since 1939, when 16 assisted in the Charter presentation to the Oregon Chapter. Seven of the 1939 group returning for the joint meeting were R. E. Chase, H. T. Griffith, E. H. Langdon, M. N. Musgrave, S. D. Peterson, J. D. Sparks, and E. L. Weber. Others of the Seattle contingent were J. S. Bowers, C. H. Bruner, L. L. Bysom, J. L. Farrar, R. L. Langdon, R. H. Liniger, J. A. McDonald, K. H. Norby, W. B. Pride, E. C. Robertson, R. M. Stern, and P. B. Tack.

Following a pre-dinner social hour, a friendly characteristic of Society gatherings, and the dinner, William A. Bowes, Portland Commissioner of Public Works, who had journeyed to Seattle with Oregon Chapter last January, welcomed the Pacific Northwest Chapter and requested further cooperation on development and improvement of codes.

A talk on Pacific Northwest Needs, Potentials, and Programs, by Col. Roy F. Bessey, chairman of the Pacific Northwest Field Committee of the Department of The Interior and representative of the Secretary of The Interior, presented a comprehensive and coordinated discussion of existing and planned private and federal projects to develop power, irrigation, water transportation, reforestation, conservation of wild life, and flood control. Illustrating his talk throughout with charts, graphs and slides, he predicted trends in utilization and sources of energy for heating.

Demonstrating the population growth at three or four times the national rate, he further stated that correlation of effort by Federal, State, City Agencies and private enterprise is necessary if the requirements of the ever-growing Pacific Northwest for electric power and cropland are to be filled. Commenting on the home builders' interest in electric heat, Colonel Bessey expressed the opinion that the heat pump would eventually gain great favor in the northwest area, but that resistance heating would be retarded until the shortage of power was relieved. A question and answer period, extending for nearly an hour, followed Colonel Bessey's talk, and disclosed much information of special interest and concern to the members of the two chapters.

A report by R. C. Chewning, chairman of the research committee, presented details of a chapter-sponsored study in regard to progress, requests for suggestions, and information on firms which might sponsor Society research. Membership Chairman K. H. Hanson reported on chapter membership.

Pacific Northwest's President Bysom expressed the pleasure of his group in the joint meeting and in regular receipt of Oregon Chapter's publication. Attendance 143. Attendance ratio 0.56.

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Philadelphia—November 11, 1948. Pres. J. O. Kirkbride opened the November meeting of the Philadelphia Chapter at the Engineers Club. The minutes of the October meeting were dispensed with, and the treasurer's report was read and accepted. Dr. E. N. Kemler, acting director of research, College of Engineering, New York University, New York, N. Y., gave an interesting talk on the Heat Pump and Its Possibilities. Attendance 98.

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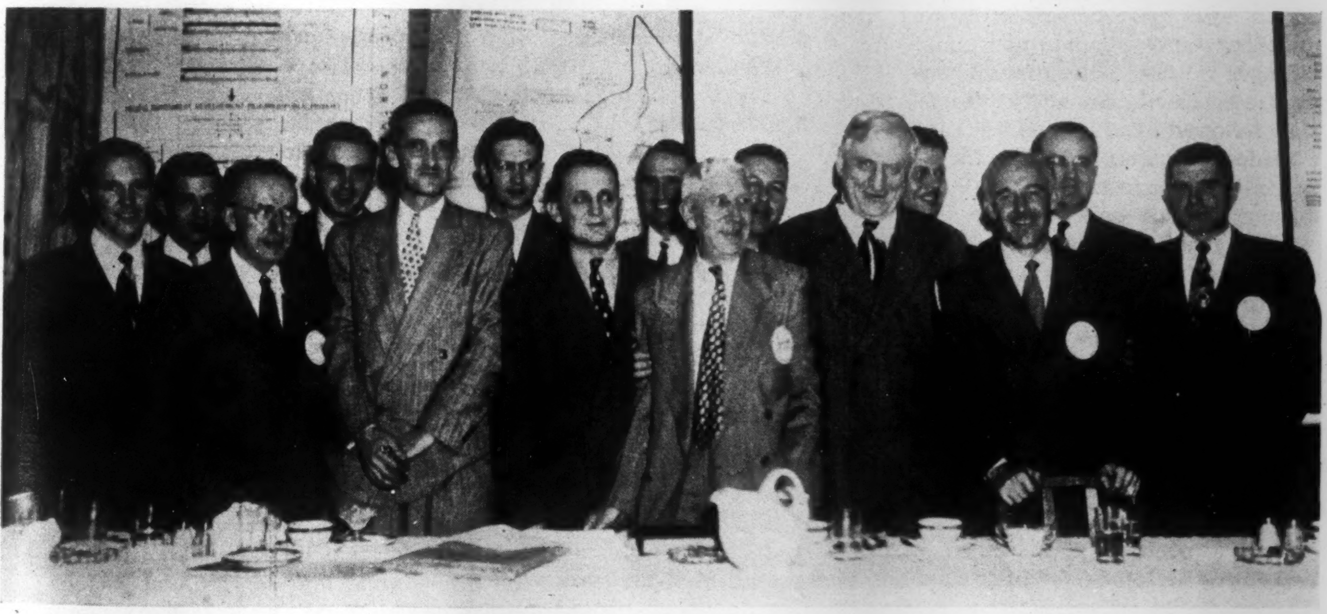
Pittsburgh—November 8, 1948. H.E. Park presided at the November meeting held at the Hotel Webster Hall. B. B. Reilly gave the treasurer's report, and H. J. Kirkendall reported for the program committee that the December meeting would be given by the Bell Telephone Co. C. H. Schneider reported on the Chapter Delegates Meeting held at the Society's Semi-Annual Meeting at Bretton Woods.

Lester T. Avery, second vice president of the Society and president of Avery Engineering Co., Cleveland, Ohio, was introduced by President Park. Mr. Avery addressed the meeting on the subject, Air Conditioning for Health. He showed slides throughout showing the effect of certain conditions on the worker and told what air conditioning means to the health of human beings. Mr. Avery's talk was based upon his own experiences in the design and installation of air conditioning systems. Considerable time was devoted to a question and answer period. The meeting adjourned at 10:30 p. m. with a rising vote of thanks to Mr. Avery. Attendance 50.



Pacific Northwest Chapter Members attending Joint Meeting with Oregon Chapter at Portland, November 4

JOURNAL SECTION

Rocky Mountain—October 6, 1948. Pres. Fred Janssen presided at the October meeting at the Olin Hotel, Denver, Colo. C. L. Bradbury reported some activities for the code committee, and J. E. McNevin suggested that the various organizations working on the heating and ventilating code coordinate their efforts in order to avoid conflicting proposals. Mr. Bradbury and President Janssen stated that there has been some cooperative effort and there will be more. Announcement was made of W. M. Larimer's retirement from active business.

The speaker of the evening, Roland L. Linder, was introduced by J. F. Mohan. Mr. Linder spoke on the subject, Correlation of Heating, Ventilating and Air Conditioning with Architecture. He stated that too often preliminary building designs are made without consulting the heating and ventilating or mechanical engineer regarding equipment and space requirements. He pointed out that a conference between owner, architect and engineer, prior to preparation of preliminary designs, would help to avoid later conflicts. He brought out the fact that engineers should avoid *gadgets* and unproved devices or methods, and should give consideration to accessibility of equipment for maintenance and repair. He further stated that engineers should take more responsibility for checking and should not make changes without advising all persons concerned. An active discussion followed Mr. Linder's talk, and President Janssen thanked him for his interesting presentation. Before adjournment it was suggested that a joint meeting of architects and engineers be arranged for further discussion of this subject. Attendance 26. Attendance ratio 0.39.

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St. Louis—November 9, 1948. After the minutes of the October meeting were read and approved, Pres. B. L. Evans called upon J. H. Carter to report on the Joint Council of Engineering Societies, the work on the slum clearance and on the Curry gas tax amendment. He stated that the Council favored slum clearance and after ten days of hard work found some serious weaknesses in the proposed Slum Clearance Bill. The Joint Council recommended that low cost housing be provided on now vacant land with priorities for those dispossessed in the slum clearance area. He also reported that the Council disapproved the Curry gas tax amendment for the reason that money would be expended by hundreds of small authorities throughout the state and that the amount of money available to these authorities would be insufficient to build adequate rural roads. H. C. Sharp reported that the Joint Council was made up of 13 engineering societies in the St. Louis area and that Mr. Carter was chairman of the committee, and further, that Mr. Carter was most instrumental in getting the work done. Mr. Sharp extended the thanks of the St. Louis Chapter to Mr. Carter for the time and effort he put into this excellent work.

President Evans then reported on the Society's Council meeting in Memphis in October and announced that money for the retirement of the Laboratory mortgage was now on hand. He then announced that G. W. F. Myers would be the Chapter Delegate and he was named as Alternate to the Annual Meeting in Chicago.

A motion was made, and unanimously carried, to send an invitation to the Society to hold its 1951 Annual Meeting in St. Louis.

Mr. Myers introduced W. C. Scott, practicing attorney in all city, state and federal courts. Mr. Scott addressed the meeting on the Taft-Hartley Law, covering the Wagner Act, which preceded the Taft-Hartley Law, and which in itself was an amendment to the former act. He also covered many interesting and controversial phases of the Act and the talk was featured by a number of excellent stories which brought the points home. An interesting and spirited discussion followed, and a rising vote of thanks was extended to Mr. Scott for his excellent address on the subject. Attendance 50.

St. Louis—October 19, 1948. The dinner meeting of the St. Louis Chapter was held at the York Hotel with President Evans presiding. Mr. Carter said that the report of the committee of the Joint Council would be released shortly. After dinner a short recess was declared, and upon reconvening the meeting was turned over to Mr. Russell, chairman of the meetings committee.

J. S. Malone then introduced the speaker of the evening, Ferdinand Jehle, director of engineering, Hoffman Specialty Co., Indianapolis, Ind., who spoke on Panel Heating. Mr. Jehle's talk covered all phases of panel heating, from calculations of panel sizes, etc. through various control methods. He accompanied his talk by slides which illustrated the various points brought up in the lecture. At the conclusion of his talk the meeting was open for discussion in which the members took an active part. Attendance 74.

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Southern California—November 17, 1948. Pres. R. S. Farr presided at the Southern California Chapter meeting held at Eaton's Restaurant, Los Angeles, and reported on the research program.

A report on the local activities of the California and National Society of Professional Engineers was given by C. R. Kidd.

The Program Chairman, J. S. Earhart, introduced the speaker of the evening who was S. R. Ellis of the Metropolitan Area Passenger System, Inc. In an illustrated discussion of A Solution for the Mass Transportation Problem of the Los Angeles Metropolitan Area, Mr. Ellis outlined a proposed rapid transit system which had been developed by Henry Babcock, consulting civil and mechanical engineer of Los Angeles. The proposed system is the result of 12 years of exhaustive study and planning and is divided into two parts; a subway system in the central metropolitan area, and coordinated surface systems as feeders from the outer areas. The presentation emphasized the need for mass transportation and showed the plan and design features as well as the economics of the proposed system.

President Farr was appointed Delegate and J. L. Blake Alternate to represent the Southern California Chapter on the ASHVE Chapter Delegates Committee. Attendance 55.

Southern California—October 20, 1948. In the absence of the president, J. L. Blake presided. J. S. Earhart, chairman of the program committee, introduced the guest of the evening, Leo A. Ohlinger, whose subject was entitled Applied Nuclear Power in Industry and Aviation. This was an interesting and enlightening lecture as it may be applied to power plant application in stationary power plants, naval vessels, and aircraft. A very interesting question period followed. The meeting adjourned at 10:20 p. m. Attendance 88.

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Southwest Texas—November 12, 1948. The First Annual Conference of the Southwest Texas Chapter was held at the Menger Hotel, San Antonio, on November 12.

Prof. W. E. Long, University of Texas, Austin, presided at the morning session, when the speakers were: E. A. Hury, Allis-Chalmers Mfg. Co., on Pumps; G. R. Rhine, consulting engineer, on Control of Self-Contained Units; and L. S. Pawkett, L. S. Pawkett Co., on Air Filtration.

Following luncheon, the afternoon session convened with I. W. Wilke, Texas Public Service Co., presiding. A talk on Fan and Blower Problems was presented by A. J. Rummel, Langhammer-Rummel Co. F. C. Benham, M. F. Fischer & Son, discussed the topic of Duct System Design, and Professor Long spoke on Noise and Vibration Problems. The last topic of the second session was the presentation of several viewpoints on the relationship of the Architect, Engineer and Contractor, by W. M. MacPherson, architect, R. W. Barnes, consulting engineer, and K. A. Monier, contractor.

At a dinner meeting, G. R. Rhine, president of the Southwest Texas Chapter presided.

The Nominating Committee was elected as follows: F. C. Benham, Jr., *chairman,* K. A. Monier, A. J. Rummel.

The speaker of the evening was Prof. G. L. Tuve, president of ASHVE and professor of mechanical engineering, Case Institute of Technology, Cleveland, whose subject was The Engineer Looks to the Future. He was introduced by Dr. F. E. Giesecke, New Braunfels, Tex., past president of the Society. Professor Tuve stressed the fact that the ASHVE is leading younger men into the engineering profession. Furthermore, engineering is diversified and there are approximately 90 societies in the field. Professor Tuve also mentioned that there is a modern trend in fuels as a source of heat. Explorations are underway in regard to sources of heat for the heat pump, solar heat and underground gasification of coal. Other trends discussed were automatic controls for modern heating and trends in comfort for health, with emphasis on more fresh air dilution to assist in providing health and comfort. Professor Tuve also presented some interesting and informative slides on air distribution. He emphasized the need of getting away from air conditioning by producing drafts.

Much favorable comment was expressed by those in attendance on the success of the conference. The total registration was 70 and, in addition to President Tuve and Dr. Giesecke, C. R. Gardner, Dallas, chairman of the ASHVE Chapter Delegates Committee, attended.

The next meeting of the Chapter was scheduled for December 14 at the Menger Hotel, San Antonio, with H. C. Woodward, Yarnall-Waring Co., Philadelphia, to present a film on There Is An Engineering Reason. Attendance 60.

Southwest Texas—October 28, 1948. The Cavalier Room in the Menger Hotel, San Antonio, was the meeting place of the Southwest Texas members for their October meeting. Pres. G. R. Rhine presided and presented an outline of a program for the all-day meeting scheduled for the November meeting, at which time G. L. Tuve, president of the Society, will be the guest speaker. I. W. Wilke and F. C. Benham were appointed delegate and alternate to the Chicago Annual Meeting in January. As this was primarily a business meeting, no scheduled speaker was on the program. However, A. M. Chase, Jr., Production Equipment Co., Houston, and a member of the South Texas Chapter, gave a brief talk and reported on the recent meeting of the *Southwestern Ice Manufacturers Association.* Attendance 15.

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Utah—October 13, 1948. Pres. E. J. Watts called the meeting to order at Covey's Coffee Shop, Salt Lake City, and addressed the meeting relative to the Society's 55th Annual Meeting to be held in Chicago in January, the Speaker's Bureau program, membership in the Society and in the Chapter, and the progress of research.

The following were elected to act as a Nominating Committee for the annual election of officers in May: H. D. Miller, A. A. Maycock, H. G. Richardson, Jr., D. R. Wilde, and J. L. Ashton.

The meeting was turned over to E. V. Gritton, chairman of the Program Committee, who presented a sound film and a color film on Utah's Playground. Attendance 21. Attendance ratio 0.37.

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Washington, D. C.—October 13, 1948. The first meeting of the Fall season was held at the Old New Orleans Restaurant, Washington, D. C., and Pres. A. S. Gates, Jr., presided. After a report on the membership status by S. R. Allen, chairman of the membership committee, President Gates introduced the honored guest of the evening, A. E. Stacey, Jr., first vice president of the Society and process consultant, Carrier Corp., Syracuse, N. Y.

In his preliminary remarks, Mr. Stacey recalled many interesting facts regarding the early history of the Society, trends of membership, and early research work. His talk entitled, The Engineer and Economic Mobilization, dealt with Government plans to mobilize industry in the event of a future armed conflict with a foreign power. Mr. Stacey pointed out the many problems of wartime industrial production and cited an example showing that 24 months might be necessary to construct a plant to supply power to an aluminum plant which itself might require only 18 months to construct. Manpower was cited as the most important factor in an evaluation of a country's strength. Boards and Committees at various levels of authority for the protection of the National Security were discussed.

After answering many questions concerning his address and concerning the Society's affairs, Mr. Stacey received the Chapter's thanks and the meeting was then adjourned. Attendance 48. Attendance ratio 0.31.

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Western Michigan—November 8, 1948. Pres. H. W. Wolters presided at the second meeting of the season, which was held in the basement of the Presbyterian Church, Battle Creek. The question of the Chapter aiding in the paying of a portion of the expenses of the Chapter Delegate or Alternate to Society meetings was discussed. Prof. C. H. Pesterfield discussed briefly the duties of the Chapter Delegates and Nominating Committee.

J. L. Alexander introduced John Howatt, past president of the Society and chief engineer, Board of Education, Chicago, Ill., who addressed the meeting on The Society, Past, Present, and Future. Mr. Howatt's interesting talk was followed by a movie on the Construction of Golden Gate Bridge through the courtesy of the Kalamazoo Foundry and Machine Co. and the Bethlehem Steel Co. The meeting adjourned at 10:05 p.m. Attendance 59. Attendance ratio 0.70.

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Western New York—November 15, 1948. This meeting, held in the auditorium of the Engineering Division of the University of Buffalo, was combined with a panel discussion and was attended by 55 members and guests as well as 30 University students. After dispensing with the regular meeting formalities, the meeting was turned over to W. R. Heath, chief engineer, Buffalo Forge Co., who acted as moderator. Assisting Mr. Heath on the panel were, Joseph Davis, heating contractor, M. C. Beman, consulting engineer, W. E. Voisinet, engineer and manufacturer's agent, and Charles Stone.

Questions came from the students and were answered by members of the panel. After the panel discussion was over, F. J. Weber thanked Dean Mohn of the University for extending the invitation to the Chapter and thanked the members of the panel for their cooperation.

Roswell Farnham then presented, on behalf of the Chapter, copies of the Society's GUIDE and TRANSACTIONS, to the library of the Engineering Department of the University, as well as a subscription to *Heating, Piping & Air Conditioning*. Dean Mohn expressed his appreciation to the Chapter and invited the members and guests to inspect the shop facilities at the University. Attendance 55.

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Wisconsin—November 15, 1948. Pres. W. A. Ouweneel presided at the November meeting which was held at the Engineers' Society Building, Milwaukee. R. D. Rodwell of the program committee announced that B. A. Jacobi, chief engineer, Lerner Stores Corp., New York, N. Y., would speak at the December meeting on Air Conditioning in chain stores. Following a discussion on the suggested change in the Chapter's by-laws a motion was made and passed that the annual dues of resident members would be $5.00, payable in advance of January of each year. It was explained that a resident member is one whose business, place of employment, or residence is located in Milwaukee County. It was voted that the annual dues of non-resident members be $1.50, payable in advance of January of each year.

The speaker of the evening, R. K. Thulman, chief mechanical engineer, Federal Housing Administration, Washington, D. C., was introduced by F. J. Nunlist, Jr. Mr. Thulman told of his experiences in making two trips to Great Britain as a consultant on post war housing problems and stated that domestic heating in the form of central warm air, hot water and steam systems is practically non-existent in Great Britain. He explained that the majority of building heat is supplied by stove or fireplace. A standing vote of thanks was given the speaker following an interesting discussion period. Attendance 64. Attendance ratio 0.27.

Wisconsin—October 18, 1948. The members and guests assembled at the Engineers' Society Building, Milwaukee, for their regular monthly meeting, at which President Ouweneel presided. N. E. Hill brought up the matter of student branches and the matter was referred to Ernest Szekely, who stated that this subject had been discussed in a meeting with the Board of Governors and it was felt that Madison was too far distant to attempt to start a student branch at the University of Wisconsin.

Fred Johnson, manager, Kathabar Division, Surface Combustion Corp., Toledo, Ohio, was introduced and spoke on The Specialized Use of Lithium Chloride Sprays in Industrial and Comfort Air Conditioning. Slides were shown illustrating applications in a restaurant, chemical laboratory, foundry and in a hotel. He stressed the effectiveness of lithium chloride in removing odors and preventing the frosting of direct expansion coils. A question and answer period followed and the meeting was adjourned after a rising vote of thanks. Attendance 33. Attendance ratio 0.22.

Student Branches

Purdue University—November 10, 1948. D. M. Long, chairman of the Executive Committee, opened the meeting of the Purdue Student Branch in the Mechanical Engineering Building. The general procedure of business was followed and L. M. Zoss reported on the work being carried on by the membership committee in organizing a membership data card file. J. H. Miller, chairman of the program committee, conducted a short discussion on the plans for a group to attend the Annual Meeting and Exposition in Chicago in January.

W. P. Chapman, research engineer, National Tube Co., Pittsburgh, Pa., gave a very interesting discussion of the problems encountered in finding experimentally the resistance offered by the various building materials to heat flow from the coils to the surface of a panel. Among the many facts stressed in the discussion were the recommendation that petcocks be placed on each runout in the initial installation for the purpose of eliminating air when filling the system, that corrosion is not a problem in a closed system, that concrete and steel have about the same coefficient of expansion, and that the hot water radiant heating industry does recognize the problem of ventilation requirements. An informative question and answer period concluded the main program of the evening.

After an expression of thanks to Mr. Chapman, Mr. Miller announced that the election meeting would be held in December. Attendance 67. Attendance ratio 0.68.

Purdue University—October 13, 1948. The secretary's report was read and approved, and the executive committee for the 1948 Fall term was introduced. D. M. Long then presented F. B. Morse, instructor at Purdue University, who outlined the position of the Purdue Student Branch in connection with the Indiana Chapter of the Society.

Mr. Miller then introduced the speaker of the evening, Dr. Yeram Touloukian, assistant professor at the University's Mechanical Engineering School, who recently returned from a three-month tour of England. Dr. Touloukian related many of his interesting experiences at the Olympic Games, gave a short resumé of the life of an Englishman in the post war era, and compared the campus life of an American and an English scholar. Attendance 53. Attendance ratio 0.52.

Purdue University—October 5, 1948. Prof. W. T. Miller called the meeting to order in the Mechanical Engineering Building for the purpose of electing three members of the executive committee. The following were designated to serve for the 1948 Fall term: D. M. Long, *chairman;* J. H. Miller, vice chairman; H. W. Collins, secretary; M. E. Naftzger, reporter; and L. M. Zoss, coordinator. The meeting was adjourned by Professor Miller at 5:05 p.m. Attendance 19. Attendance ratio 0.52.

* * *

North Carolina State College—November 9, 1948. J. G. Marshall, president of the Student Branch, called the meeting to order and dispensed with the reading of the minutes, and turned the meeting over to Basil Greene of the program committee. Mr. Greene welcomed the many engineers, architects, heating contractors and manufacturers who came to hear H. A. Lockhart, chief engineer, Bell & Gossett Co., Morton Grove, Ill., speak on Hot Water Heating.

Mr. Lockhart's talk was interesting and instructive. In his opening remarks he sketched the progress of hot water heating from the last century to the present. This was followed by a detailed review of the many important and variable factors in the proper design of hot water heating systems. He illustrated his talk with slides and a full display of equipment. A spirited discussion followed. It was the opinion of the student body that this was the most successful open meeting of this semester. P. L. Guest, Jr., of the North Carolina Chapter of the Society, helped to arrange the details of the meeting. Attendance 36. Attendance ratio 1.0.

* * *

Texas A. & M. College—October 22, 1948. The meeting was called to order in the lecture room of the Mechanical Engineering Building, with Pres. S. E. Ammons presiding. It was announced that the November meeting would be a joint meeting with the South Texas Chapter in Houston.

J. D. Poythress, W. E. Lewis Co., Dallas, guest speaker and member of the North Texas Chapter, gave a lecture-demonstration concerned with uses, construction, operation, and installation of automatic controls. This was followed by a short and interesting discussion. Attendance 32. Attendance ratio 0.56.

C. F. TWIST DIES AT 75

Word has been received of the death, on September 10, of Charles F. Twist, a member of the Society since 1921, and president of the Ashwell-Twist Co., Seattle, Wash.

Mr. Twist was born in Maine on November 26, 1873, and moved to the Puget Sound area about 45 years ago. He organized the Ashwell-Twist Plumbing and Heating Co. in 1920 with the late W. J. Ashwell as his partner. In 1943 Mr. Twist sold the Ashwell-Twist Co. to W. A. MacDonald and Neil Hammer, both long time employees of the company, and retired from active business.

He suffered a stroke four years ago and succeeding illnesses brought about his death. He is survived by his widow, Edna, to whom the Officers and Council of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS extend their deepest sympathy.

Candidates for Membership

The Constitution of the Society, as now amended, requires the following mode of procedure in voting on applicants for membership in the Society. All applications for membership are to be sent to the Secretary and the names of applicants and their references shall be printed in the next issue of the Journal of the Society or sent to the members in other approved manner as ordered by the Council. When the replies are received from references, the Candidate's application shall be submitted to and acted upon by the Committee on Admission and Advancement as soon as possible.

When the Committee on Admission and Advancement has acted favorably upon a Candidate's application and assigned his grade, the Council shall vote upon the election of the proposed Candidate for membership by letter ballot. During the past month 160 applications for membership have been received and the names of these men and their sponsors are published in the following list.

Members are requested to scrutinize the list with care. The Committee on Admission and Advancement, and in turn the Council, urge members to assume their share of responsibility of receiving these candidates into membership by advising the Secretary promptly of any whose eligibility for membership is in any way questioned.

All correspondence in regard to such matters is strictly confidential, and is solely for the good of the Society, which it is the duty of every member to promote.

Unless objection is made by some member by January 25, 1949, these candidates will be balloted upon by the Council. Those elected to membership will be notified by the Secretary immediately after election.

Algie, W. L. Sales, Warden King, Ltd. Proposers: W. R. Blackhall, J. A. Norton. Seconders: A. M. Clark, J. J. Lawlor.

Allen, C. E., Secy. & Sales Mgr., Michigan Automatic Heating Equipment Co. Proposers: R. H. Swart, V. C. Dean. Seconders: W. L. Clarke, T. D. Stafford.

Bailey, W. J., Sales Mgr., Illinois Testing Laboratories, Inc. Proposers: Harold Stamps, C. M. Burnam, Jr. Seconders: G. W. Bornquist, C. E. Price.

Barnes, J. J., Jr., Student, North Carolina State College. Proposers: L. L. Vaughan, R. B. Rice. Seconders: J. S. Doolittle*, N. W. Conner*.

Bastick, F. G., Mgr., Service Heat & Power Co. Proposers: F. M. Hill, L. J. Helms. Seconders: J. L. McCullough, R. C. Snow.

Becher, Poul, Dir. of Res., The Danish National Institute of Building Research. Proposers: K. T. Enevoldsen*, V. L. Jordan. Seconders: S. F. Jespersen, N. M. Plum*.

Berry, Wanda F., Engrg. Design Dr., Nemec & Wright. Proposers: F. L. Nemec, Eric Roberts. Seconders: T. C. Douglass, Jr., F. W. Berger, Jr.

Black, J. M., Engr., Avery Engineering Co. (*Advancement*). Proposers: Lester T. Avery, J. E. Wilhelm. Seconders: Dennis Boggs, Paul Gayman.

Boquel, P. C., Asst. Dist. Engr., New York Steam Corp. Proposers: J. F. Collins, Jr., R. D. Martin. Seconders: A. R. Mumford*, L. S. Phillips.

Bordelon, J. Y., Partner Mgr., St. Landry Supply Co. Proposers: L. V. Busenlener, E. O. Thoman. Seconders: C. V. Bankston, R. B. Guest.

Bowen, C. H., Chief Mech. Engr., Consoer, Townsend & Associates. Proposers: C. C. Graves, C. W. Johnson. Seconders: H. C. Stevens, C. W. De Land.

Bromberg, Sidney, Air Cond. Engr., Straus-Frank Co. (*Advancement*). Proposers: D. M. Mills, F. C. Brandt. Seconders: H. C. Will, H. W. Gillis.

Brown, J. S., Draftsman-Jr. Engr., Consolidated Conditioning Corp. Proposers: J. D. W. Robertson, L. K. Howes. Seconders: Joseph Meltzer, John Ammann*.

Burke, R. E., Asst. Mgr., Sales, New York Steam Corp. Proposers: J. F. Collins, Jr., R. D. Martin. Seconders: A. R. Mumford*, L. S. Phillips.

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Grodner, Murray, Field Engr., Edison Cooling Corp. Proposers: Benjamin

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VAN GENDEREN, WILLIAM, Owner, Wm. Van Genderen. PROPOSERS: Fred Janssen, F. C. Allen. SECONDERS: M. Hook, H. W. Marshall.

VAUGHAN, O. S., Student, North Carolina State College. PROPOSERS: L. [illegible] Vaughan, R. B. Rice. SECONDERS: J. [illegible] Doolittle*, N. W. Conner*.

WAITE, A. E., Engr.-Estimator, Spitzley-Rettenmier Sheet Metal Co. PROPOSERS: J. H. Spitzley, L. A. Bur[illegible]. SECONDERS: G. L. Davis, Jr., J. [illegible] Black, Jr.

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YOUNGERS, J. F., Gen. Mgr., Welding & Steel Fabrication Co. PROPOSERS: J. H. Bryce, Joseph Davis. SECONDERS: M. C. Beman, W. R. Heath.

The following candidates are students of Purdue University. They are proposed by W. T. Miller and F. B. Morse and seconded by L. M. Zoss and D. M. Long.

ADAMS, W. G.
ALLENDORPH, G. P., JR.
ALTGELT, R. E.
BASCH, HUGO
BEHNING, F. P.
BOCK, EDWIN
CAIN, J. A.
CASEBEER, H. M.
COLEMAN, R. E.
CRANKSHAW, R. B.
DALRYMPLE, C. J.
DEMJEN, F. J.
DEPREE, H. J.
DRAKE, G. M.
DUNN, R. J.
EDWARDS, J. D.
EMBER, GEORGE, JR.
FORD, R. L.
GLUNK, C. W.
HAYES, D. R.
HAZARD, G. T.
HUNTER, A. J.
INNIS, F. B., JR.
LAFOLLETTE, J. O.
MARKSTROM, G. R.
MAYERHOFER, H. B.
MCMAHON, W. R.
MILLER, G. E.
MYERS, C. L.
POPEJOY, R. H.
PROCTOR, R. G.
QUINN, J. W.
REDDING, FLOYD
ROSS, W. D.
SHELLEY, R. L.
TUTTLE, J. D.
WADE, C. M.
WALKUP, H. W.
WEST, T. L., JR.
WESTCOTT, D. P.
WRIGHT, J. E. JR.

John R. Allen Memorial Library

The ASHVE Committee on Research gratefully acknowledges the following gifts to the John R. Allen Memorial Library, which is maintained at the ASHVE Research Laboratory, Cleveland, Ohio.

Fan Engineering, edited by R. D. Madison. Gift of the editor.

Basic Principles of Ventilation and Heating, by Dr. Thomas Bedford. Gift of the author.

Warm Air Heating and Winter Air Conditioning, prepared by The Lennox Furnace Co. Gift of the company.

The Efficient Use of Steam, by Oliver Lyle. Gift of Dr. W. A. Macfarlane.

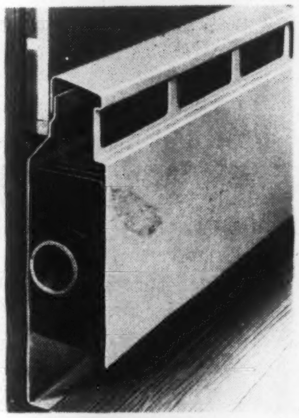
Proceedings of the National District Heating Association (1947). Gift of the *Association.*

The presentation of textbooks and pamphlets in the field of heating, ventilating, and air conditioning and allied fields by authors and others will be welcomed by this library. Suitable book plates carry the name of the donor and date of the gift.

EQUIPMENT DEVELOPMENTS

For your convenience in obtaining more information about any of this equipment, see coupon on this page.

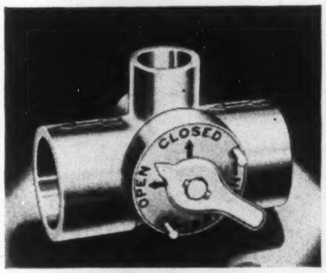
Front Slot Opening Used in Baseboard Radiation Cover



No. 3933—Vulcan Radiator Co., Hartford 6, Conn., has developed a new front cover for its baseboard radiation. Designed for improved functional and decorative appeal, the style FS front cover is made of 18 ga steel with a new front slot opening said to provide more efficient air circulation. Convection currents, say the company, are directed away from immediate contact with wall surfaces, preventing concentration of dust particles and reducing smudging.

It is furnished for both 1 and 1¼ in. IPS semi-recessed or nonrecessed installations and can be used to replace the company's standard baseboard cover, since the method of hanging is the same. Maximum length in one piece is 8 ft. Shorter lengths are furnished only in multiples of 4 in. Corner pieces, joining pieces, and end enclosures complete the design.

Adjustable Bronze Tee Regulates Flow in One Pipe Hot Water Systems



No. 3934—A new bronze adjustable supply tee for copper, one pipe hot water heating installations is being offered by H. A. Thrush & Co., Peru, Ind.

Designed to provide close control of water flow through each radiator of single main, forced circulating heating systems utilizing copper pipe, the tee is said to greatly simplify the balancing of convector or radiator output, as any amount of flow can be diverted through each radiator.

One unit is used for each up-feed radiator. All connections are of the solder type and available sizes are from ¾ to 1½ in. with ½ in. connections provided for the rizers.

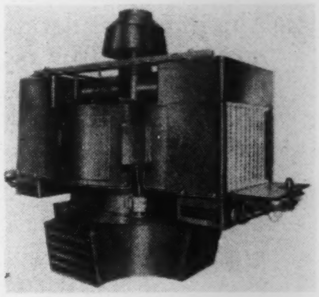
Resistance Bulb Used to Measure, Control Temperature

No. 3935—Anticipating a demand for the new "Dynatherm" resistance bulb, following its introduction at the ISA instrument show, Foxboro Co., Foxboro, Mass., has announced that the bulb is in full scale production and can be supplied with any "Dynalog" instrument, whether recorder, controller, or the new "Multi-Record" model.

The bulb is a standard product which is said to be suitable for any critical application of temperature measurement or control in ranges below 600 F. It can be installed to replace any thermocouple or filled system bulb in a well of ¼ in. diameter or more and of any depth or any material.

Heat transfer to the sensitive portion of the bulb is through its tip. Used with the company's electronic instruments, it is said to provide mechanical convenience, great stability, small size, and fast response.

Revolving Discharge Outlets Used on Gas Fired Unit Heater



No. 3936—A self contained, gas fired revolving unit heater has been announced by L. J. Wing Mfg. Co., 14th St. & 7th Ave., New York 11.

Designed for overhead location, it is said to project the heated air in all directions to the working level. The heat exchanger and combustion chamber are cast in one piece of grey iron. Extended surface fins on the heat exchanger are cast integral, and burners are constructed of grey iron with drilled ports. Each tube of the exchanger has a separate burner head.

The unit, which is approved by the American Gas Association, may also be used to provide air circulation in summer.

New Product Developments Include Small Motor, V Belt Sheave, Pump

No. 3937—Recent developments in equipment for a variety of industries have been announced by Allis-Chalmers Mfg. Co., Milwaukee 1. These include a new line of small motors for driving fans, compressors, pumps, machine tools, and similar equipment, a new automatic "Texrope" sheave, and a new self priming pump.

FOR YOUR CONVENIENCE

Heating, Piping & Air Conditioning **[1-49]**
6 N. Michigan Ave., Chicago 2, Ill.

Please ask the manufacturers to send me more information about the equipment mentioned under the following reference numbers in Equipment Developments and Recent Trade Literature

(Circle each number in which you are interested)

3933	3934	3935	3936	3937	3938	3939	3940	3941	3942
3943	3944	3945	3946	3947	3948	3949	3950	3951	3952
3953	3954	3955	3956	3957	3958	3959	3960	3961	3962
3963	3964								
7083	7084	7085	7086	7087	7088	7089		7091	7092
7093	7094	7095	7096	7097	7098	7099	7100	7101	7102
7103	7104	7105	7106	7107	7108	7109	7110	7111	7112
7113	7114	7115	7116	7117	7118				

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Infra Insulation Is Never A Wet Blanket

Excludes Unwanted Heat, Cold or Vapor—Never Retains Them

Infra Accordion Aluminum Insulation neither absorbs, retains, nor is harmed by moisture. Fireproof, it will not swell or warp, is effective at any temperature. One carton, 2½ cubic feet of Infra, provides 1000 square feet of insulation. Infra is easy to unpack and install.

Read the following quotation from a paper by a renowned authority on Insulation, Prof. G. B. Wilkes of Massachusetts Institute of Technology:

> *"Due to its light weight, the heat storage capacity is very low and consequently, a wall or roof, insulated with aluminum foil will tend to reach thermal equilibrium with the surroundings quicker than one insulated with the heavier types of insulation. Under summer conditions, with a falling temperature at night after a hot day the roofs and ceilings of a home insulated with foil will tend to cool more rapidly than if they were insulated with heavy materials.*
>
> *"The reverse is also true, a foil insulated structure will tend to heat quicker than one insulated with ordinary insulation."*

Thermal Factors Stamped on Every Infra Carton

Infra C Factors and Rockwool Equivalents

C.052 Heat Flow Down, equals 6" Rockwool.
C.083 Heat Flow Up, equals 3.97" Rockwool.
C.10 Lateral Heat, equals 3-1/3" Rockwool.

WRITE FOR FREE 32-Page BOOKLET: "Simplified Physics of Thermal Insulation"

Architects and engineers use it as a handbook, and colleges as a text, on heat transfer, condensation, vapor, mold, radiant heating, etc. Contains chart of *k*, C, R and U factors of all insulations, of all thicknesses, weights, densities.

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MULTIPLE ACCORDION ALUMINUM and TRIANGULAR REFLECTIVE AIR CELLS

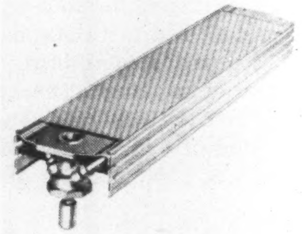
Infra INSULATION, INC.
10 Murray St., N. Y., N. Y.

The small motors, ranging from ½ to 7½ hp, available on NEMA frame sizes 203 to 284, inclusive, totally enclosed nonventilated and totally enclosed cooled models, in both standard and explosionpr types. They feature ribbed yoke construction, die aluminum rotors, and prelubricated sealed bearings.

Motion control in the variable pitch diameter typ v belt sheave is offered by the new "Vari-Pitch" au matic sheave. Used with an ordinary companion she and a "Texslide" motor base, it is designed to per speed adjustment up to a 2:1 ratio while the driv in motion.

The new self priming pump, built in the close cou style of the "Electrifugal" line, has been designed pumping gasoline, oil, kerosene, and other light distillants. Featuring automatic air evacuation during the priming cycle, it is available in sizes from 1½ to 3 in. with capacities from 30 to 350 gpm and heads up to 300 ft. To facilitate pump assembly and disassembly, a new coupling has been devised which employs the tapered split bushing principle used in the "Magic-Grip" v belt sheaves.

Convector Specifically Designed for One Pipe Steam Systems

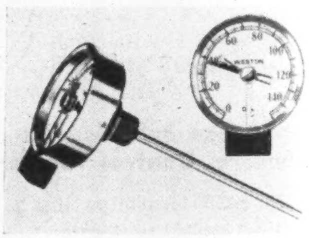


No. 3938—The new "Quiet-Seal" convector radiation has been developed by Modine Mfg. Co., Racine, Wis., and is said to provide smooth, quiet, full capacity performance on one pipe steam heating systems by the elimination of water hammer, gurgling noises, air binding, and spitting of water from air vents.

Chief feature of these units, specifically designed for one pipe systems, is the avoidance of counterflow of steam and condensate in the same passages. Steam, condensate, and air (when present) all flow in the same direction and the condensate is returned to a built-in trap or water seal from which it overflows and drains into the supply branch. This seal is also designed to permit free venting. The heat output from each convector can be modulated by a built-in damper.

Units are available in 10 lengths from 20 to 64 in., four heights from 18 to 32 in., and 4, 6, 8, and 10 in. depths.

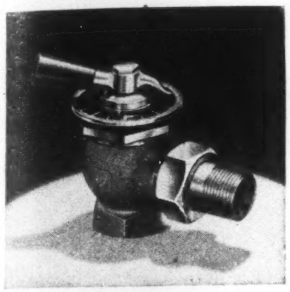
Combines Indicating Thermometer with Alarm or Control Device



No. 3939—A new contact making thermometer, designed to combine the features of an indicating thermometer and an alarm or control device, has been introduced by Weston Electrical Instrument Corp., 617 Frelinghuysen Ave., Newark 5, N. J.

The instrument consists of the company's all metal thermometer with an adjustable contact arm mounted in the glass and bezel as illustrated. A screw type terminal block mounted on the periphery of the case front

1



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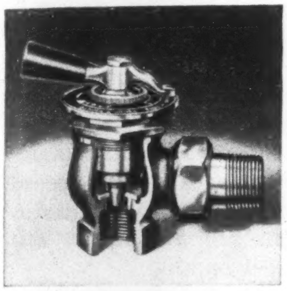

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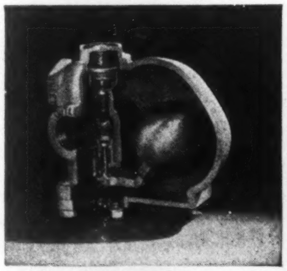

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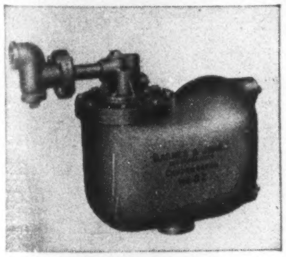


5

BARNES & JONES

VAPOR and VACUUM HEATING SYSTEMS and EQUIPMENT

1 THERMOSTATIC RADIATOR TRAPS

2 MODULATION VALVES

3 ORIFICE VALVES

4 FLOAT AND THERMOSTATIC TRAPS

5 CONDENSATORS

Illustrated below is a typical Barnes & Jones Zone Control Installation

Castle Village, New York City

BARNES & JONES INC.

128 BROOKSIDE AVENUE JAMAICA PLAIN 30, MASS.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

You GET CORROSION RESISTANCE

Plus

FAST ECONOMICAL ASSEMBLY

with these ELCO SCREWS

STAINLESS STEEL
ALUMINUM
BRASS BRONZE

HOLDING POWER

Elco fasteners made of stainless and other non-ferrous materials not only give corrosion resistance, but also holding power under continuous tension, because they are made from carefully analyzed materials, maintained from constant sources.

UNIFORMITY

Elco heads, threads and slots are made consistently alike under a system of rigid production control. This is assurance against defects and costly delays.

FAST ASSEMBLY

Quick, easy-starting points with accurately formed heads threads and slots, qualify Elco fasteners for mechanical pick-up and driving. Hours of handling time are saved.

SERVICE

After the assembly job is done, Elco service carries on. Strong hardened threads stay tight and rattle-free longer, permit removal and replacement, without danger of stripping, damaging or reducing the fit.

Why not write today and inquire about Elco screws to meet your requirements. Send for new catalog No. 48.

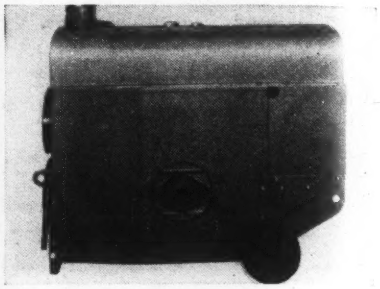
ELCO Screws

ELCO TOOL AND SCREW CORPORATION
1920 BROADWAY ROCKFORD, ILLINOIS
WOOD SCREWS • MACHINE SCREWS • MACHINE SCREW NUTS
DRIVE SCREWS • CAP SCREWS • LAG SCREWS • SPECIAL SCREWS
TAPPING SCREWS • STOVE BOLTS • PIPE PLUGS

provides for electrical connection. The contact arm m be set to make contact at any temperature over t entire scale, and while contact can be broken manua after an alarm has been sounded, the contacts are s to "break" automatically on a temperature change about 5 percent.

The thermometer can be supplied to make contact either increasing or decreasing temperature. The acc acy as an indicating thermometer is ± 1 percent; a as a control device ± 1½ percent of the full scale ra —says the company. The instrument is available stem length from 2½ to 24 in., with longer stems ava able on special order.

Portable Heaters Burn Kerosene

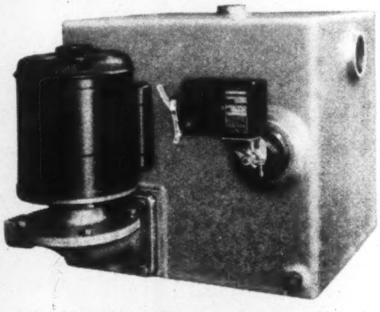


No. 3940—Two new electric powered, kerosene burning, portable heaters for temporary and semi-permanent heating applications have been developed by Herman Nelson Corp., Moline, Ill. Both are said to feature complete separation of the products of combustion from the ventilating air stream, as well as forced hot air delivery to the areas where needed.

The "deluxe" model has a heating capacity of 250,000 Btu per hr. Standard equipment includes two 12 in. diameter by 12 ft long collapsible canvas ducts through which heated air may be directed to areas where needed. Also included are two wheels for moving in wheelbarrow fashion. Ignition and operation are automatic, with manual controls for starting and stopping.

The "economy" model has a standard 1/3 hp motor and a propeller fan. Capacity is 125,000 Btu per hr. Standard equipment includes one 12 in. diameter by 12 ft long, collapsible canvas duct.

Simplicity Features Design of Condensation Pump Unit



No. 3941—An entirely new, compact, low price condensation pump with several improved engineering features has been developed by Sterling, Inc., 3744 N. Holton St., Milwaukee 12. Known as the 4100 series condensation pump, the new unit is rated to handle any capacity up to 6000 sq ft E.D.R. against a discharge pressure up to 20 psi.

All parts such as the motor, pump, float switch, and drain plug are accessible from the front for inspection and servicing. By removing four cap screws, the motor and impeller assembly may be lifted from the pump housing without disconnecting piping. The two piece construction of the bronze impeller has been designed specifically for this unit. The impeller is fitted with an

ARMSTRONG STEAM TRAPS

ARMSTRONG "INVERTED BUCKET" STEAM TRAP

Are Guaranteed

1. Free from defective materials or workmanship;
2. To function perfectly;
3. To fulfill all claims in every respect;
4. To give COMPLETE SATISFACTION.

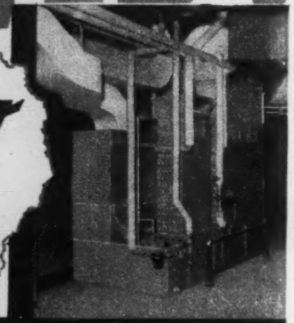
ONLY A GOOD STEAM TRAP COULD POSSIBLY BE BACKED BY SUCH A GUARANTEE!

Send for the 36-page Armstrong Steam Trap Book containing complete information on trap selection, installation and maintenance practice.

ARMSTRONG MACHINE WORKS

874 MAPLE STREET, THREE RIVERS, MICHIGAN

PROVED!



Kathabar

HUMIDITY CONDITIONING FOR PROCESSING AND COMFORT

IN LEADING INDUSTRIES

A PARTIAL LIST OF KATHABAR APPLICATIONS

CHEMICAL
Photographic Film Processing and Storage
Match Drying • Stencil Drying
Sensitized Paper Mfgr.
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Gelatin Capsule Processing
Glue Drying • Shellac Drying
Chemical Processing
Processing of Sodium
Vitamin Mfgr.
Gunpowder Processing
Processing Plastics
Rocket Powder Processing

MANUFACTURING
General • Ceramics Drying
Storage of Highly Finished Metal Parts (Corrosion Prevention)
Compressed Air Drying
Covered Cable Drying

METALS INDUSTRY
Powdered Metals Processing
Cupola Dry Blast (Foundry)
Safety Glass Manufacturing
Magnesium Castings Production
Aluminumizing Process

FOOD
Drying of Icings—Bakery
Candy Making • Fish Drying
Bean Sprout Cultivation
Vegetable Dehydration
Processing Powdered Coffee
Cranberry Dehydration
Milk Drying • Spaghetti Mfgr.

LEATHER
Shoe Drying

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Paper Making

TEXTILE
Rayon Storage
Nylon Hosiery Knitting

MISCELLANEOUS
Cargo Ship Dehumidification

LABORATORIES & TEST ROOMS
Paper Testing
Metals Laboratory
Rubber Testing Laboratory
University Laboratory

COMFORT AIR CONDITIONING
Auditoriums • Hospitals Rooms
Department Stores • Hotels
Restaurants • Cafeterias
Drafting Rooms
Office Buildings
Banks • Dental Laboratories

● In 1942, a leading midwestern pharmaceutical manufacturer installed the first Kathabar Humidity Control System in its plant. Since that time 19 additional units have been placed in operation in this plant on individual product production lines and five more units are on order to be installed. Some of these systems maintain atmospheres of less than 10 percent relative humidity at 80°F. Others at higher humidity conditions.

A pilot installation for humidity control in the plant of a leading match manufacturer proved Kathabar's superior operation over existing mechanical cooling methods by producing more consistent conditions, simplifying the operation, and reducing greatly the initial maintenance and operating costs. Their first permanent Kathabar installation was made in early 1947 and plans are now underway for complete replacement of the balance of obsolete equipment of previous methods.

These are *only two* examples where leading processing industries have benefited greatly by installing Kathabar Systems. Today there are over 300 installations in operation. Many of these units represent repeat orders. Why? Because *Kathabar Systems do control humidity—produce the desired results and reduce costs.*

GET THE FACTS ● Ask a Kathabar Humidity Engineer to tell you about Humidity Conditioning. Let him present proof of Kathabar reliability and dependability. Get the facts first-hand!

RETURN THIS COUPON

☐ Send booklets on Industrial and Comfort Humidity Conditioning
☐ Have Kathabar Humidity Engineer call. No obligation
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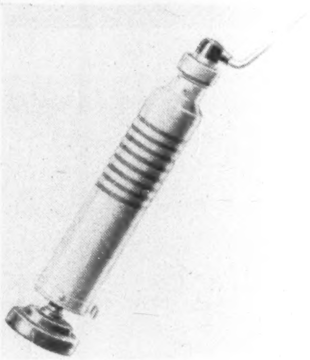
SURFACE COMBUSTION CORPORATION • TOLEDO, OHIO

oversize carbon type rotary seal which runs on the impeller hub so that the motor shaft is not exposed to corrosion by condensate. The capacitor-start ¼ hp dual voltage motor is dynamically balanced for quiet operation, is vertically mounted above the pump, and has a dripproof enclosure. Condensate is collected in a 15 gal steel tank. A built-in strainer is used to protect the pump from clogging, and levels are controlled by a non-corroding float and a single pole float switch.

Uses Discoloration Test to Check Oil Burner Smoke



No. 3942—Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, has announced an addition to its line of smoke measuring instruments—a simplified, hand operated "True-Spot" smoke tester, primarily for use in checking oil burners. It has been designed as a companion instrument of the company's "Fyrite" CO_2 indicator.

A smoke test is made by locking a paper test disc into the instrument, inserting the metal probe into a suitable hole in the smoke pipe, and drawing, with six pump strokes, a sample of the combustion gases from the furnace flue. Drawing the sample through the tester turns the test disc to a shade of gray which varies from light to dark depending upon the smokiness of the flame. The disc is then removed from the tester and the soot content of the gas sample is measured by comparing the discoloration of the disc with nine shadings on a "scale of soot" which is supplied with the instrument. The scale shows the limits of permissible smoke for various burners and types of heating systems.

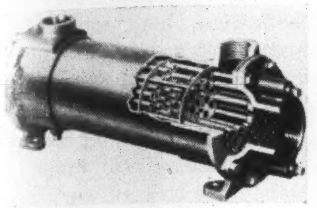
Isolates Vibration, Controls Shock

No. 3943—Lord Mfg. Co., 1635 W. 12th St., Erie, Pa., has developed a new line of holder type vertical snubbing mountings designed to isolate vibration and control severe shock in numerous industrial applications, both mobile and stationary. Load capacity is from 120 to 310 lb per mount.

Frequencies from 700 cpm upward, the manufacturer states, are isolated at their source. Snubbing shoulders are said to be inactive during normal vibration, but snub against steel washers when impact occurs, thereby cushioning shock. Washers are used to prevent excessive movement and over-stressing of the flexing element.

Three series of mountings are available. Series 279 has a deflection limit of ⅛ in. under load; series 281, 3/16 in.; series 282, ¼ in. The flexing element is made of rubber or oil resistant neoprene, depending on use.

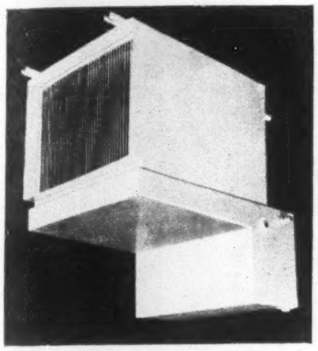
Redesigned Line of Heat Exchangers Mass Produced



No. 3944—An extensively redesigned line of type BCF heat exchangers which are mass produced and standardized has been announced by Ross Heater & Mfg. Co., Inc., 1407-1411 West Ave., Buffalo 13.

Oustanding design, availability in sizes and capacities in greatest demand, standardization, and the firm's open stock policy are said to feature the line. For diesels, gas engines, compressors, hydraulic machinery, blowers, and for many other industrial applications the manufacturer claims to have achieved the "lowest cost per Btu transferred." These nonferrous units of straight tube design are also said to be effective in heat recovery, vapor condensing, and process heating applications.

Uses Bare Tube Coil in Small Evaporative Condenser



No. 3945—The evaporative condensers offered by Kramer Trenton Co., Trenton 5, N. J., range in size from 2 to 8 tons. Specifically designed for the smaller installations, they incorporate multi-circuiting so that one, two, or three compressors may be used with each unit.

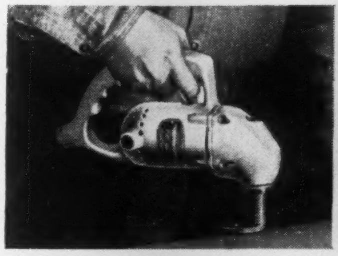
According to the company, scaling is reduced to a minimum by using a bare tube coil and a relatively large volume of water. In addition, a positive bleed arrangement is used to bleed an amount of water equal to approximately 50 percent of the water which is evaporated.

Other features are said to include the use of a direct connected recirculating pump of the packless and greaseless type, a "nonclogging" water diffuser (consisting of a large number of diffusing holes and designed to give even distribution over the bare tube coil), a rustproof casing and a stainless steel sump.

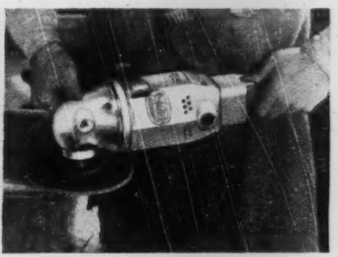
Improves Temperature, Humidity Control in Textile, Other Plants

No. 3946—Improved control of room temperature and humidity in paper, textile, tobacco, and other plants in which specific atmospheric conditions affect the quality and quantity of output is said to be possible with a new "three-in-one" instrument developed by Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, and its Brown division.

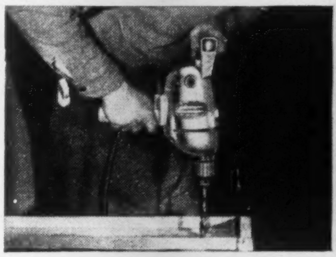
The new device is available in either pneumatic or electric types. In the former type it contains a series of flush mounted pressure gages used to indicate any changes occurring during processing. The entire controlling and indicating mechanisms, including an aspirating fan, are housed in a locked cabinet to prevent unauthorized adjustments and tampering. An added feature is a system for protecting the sensitive measuring and controlling elements against lint and dust.



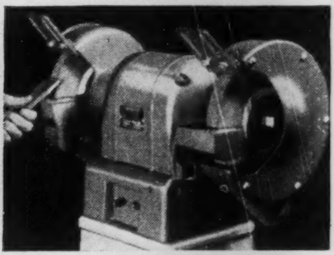
B&D Electric Porto-Shear cutting 16-gage stainless steel. Cutting action always visible to operator.



Versatile B&D Sander smooths cabinet corner. Same tool grinds, wire brushes, planes wood.



B&D ½" Standard Drill drilling holes in 10-gage frame. Other B&D Drills from ¼" to 1¼" capacities.



Fingles uses a B&D Bench Grinder for grinding down welds, beveling stainless steel edges, sharpening tools.

The way to solve *more* tooling problems . . .

BLACK & DECKER

the world's most diversified line of Portable Electric Tools!

By *standardizing* on Black & Decker Tools, The Fingles Company of Baltimore, Md. has saved time and money on scores of jobs like these. As a custom sheet metal shop, Fingles needs versatile tools to handle a wide range of jobs in the shop and on outside installations. Black & Decker "universal" tools give them this versatility—plus expert repair service from a convenient B&D Factory Service Branch to keep their tools in top production form. And *every* B&D Tool is quality-built, engineered and powered to *turn out better work, with less effort, at lower cost!* See your nearby B&D Distributor for free demonstrations. Write for detailed catalog to: The Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.

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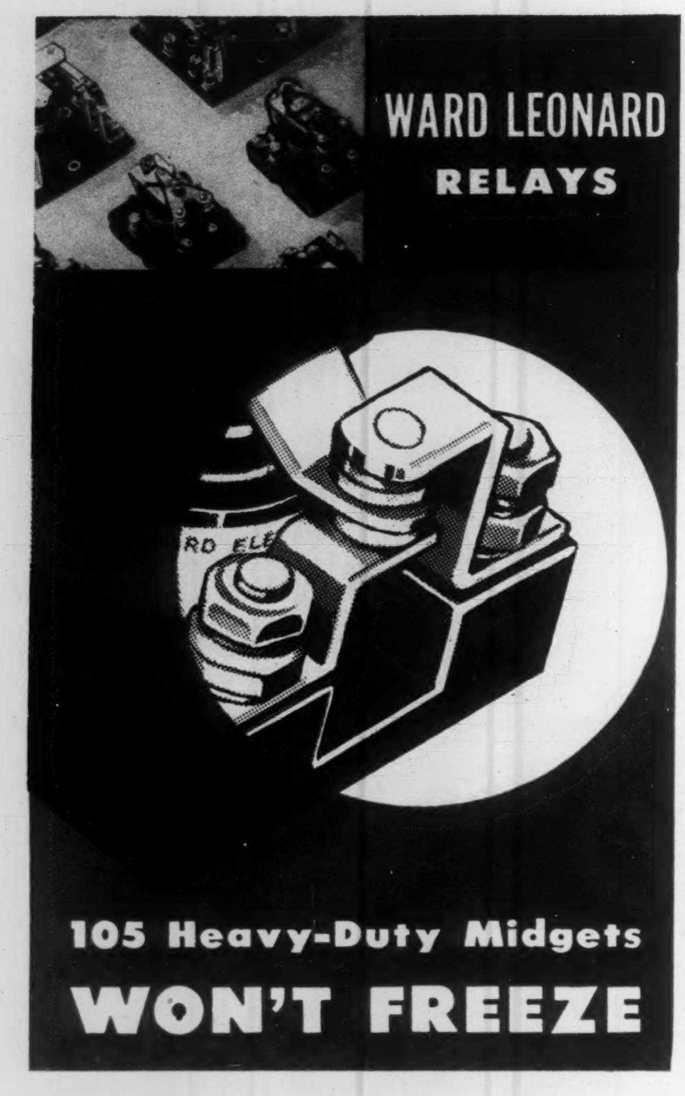
Black & Decker

PORTABLE ELECTRIC TOOLS

OTHER BLACK & DECKER TOOLS used by The Fingles Co. include Electric Hammers for cutting mortar out of joints to install flashings and for drilling holes in concrete and brick; Electric Tappers for assembly work; Portable Grinders for grinding down welds where the tool must be brought to the work.



because contacts get a GENEROUS WIPE

Unique spring suspension adds a self-cleaning action to the heavy, silver-to-silver contacts of Ward Leonard's 105 Heavy-Duty Midget Relays. These features make them self-aligning, too.

Use Ward Leonard 105 Midgets on jobs normally requiring heavier relays.

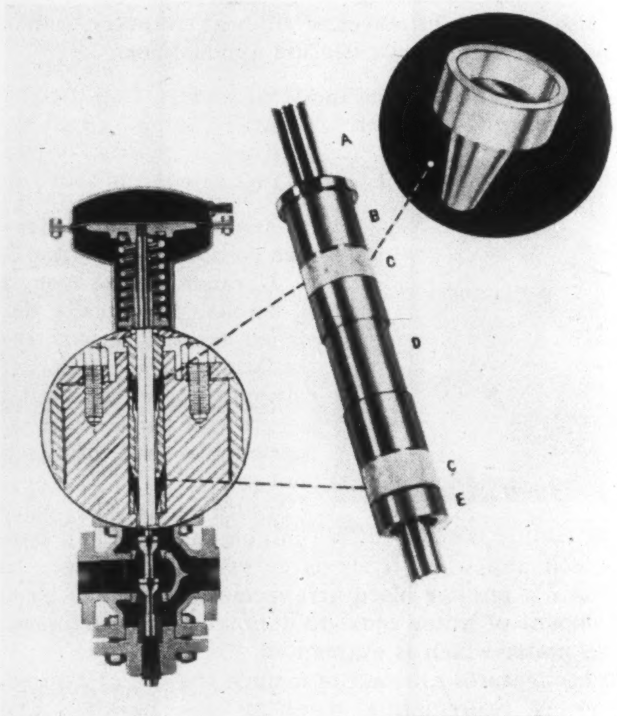
Write for Relay Catalog. Ward Leonard Electric Co., 24 South Street, Mount Vernon, N. Y. Offices in principal cities of U. S. and Canada.

WARD LEONARD ELECTRIC COMPANY
Result-Engineered Controls
RESISTORS · RHEOSTATS · RELAYS · CONTROL DEVICES
W L
WARD LEONARD

Seals Valve Stems Regardless of Operating Pressures

No. 3947—The "Dahl-Seal" is an inert plastic s l which is said to provide a frictionless, leakproof va e stem on a control valve, regardless of system pressu . The manufacturer is Hammel-Dahl Co., 243 Richm d St., Providence 3, R. I.

The control valve stem is hermetically sealed by e force of the system pressure, due to the special shap f the plastic seal which is said to replace the conventic l packing box and to require no take-up or adjustm t as it is inherently lubricated and is resistant to chem l attack. According to the manufacturer, it can be u d for any temperature for which the valve is designed d the stem can be positioned to an accuracy of 0.001 in at pressures from full vacuum to 25,000 psi.



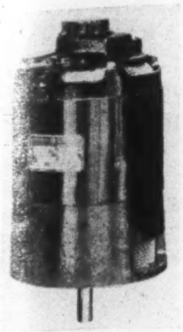
Component parts as shown in the sketch include (a) the "super" finished plug stem, (b) the gland follower, (c) the plastic seal, (d) the gland, and (e) the lower gland. While the gland follower, the gland, and lower gland clamp the plastic seal in place, the lower lip is unsupported and is subject to system pressure only which acts on the lip to seal the valve stem.

Condensation Return Unit Designed for Small Heating Systems

No. 3948—A new packaged condensate return unit, Type UA, which is said to feature simple construction and compact assembly, is being manufactured by Roy E. Roth Co., Rock Island, Ill.

Designed for use with heating systems such as in stores, small office buildings, and small industrial plants, this 20 gal unit is designed to handle high temperature condensate and is completely automatic. It includes a pump, motor, receiver tank, float switch, a strainer, piping, and a 5 sq ft base. The pump employed is the company's turbine type and is equipped with bronze liners and impeller.

signs Fractional Horsepower otors for Jet Pump Use

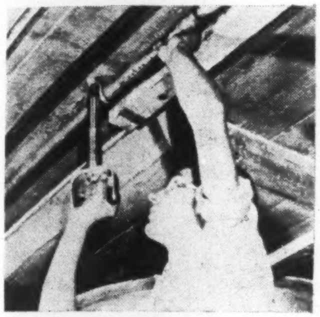


No. 3949—A new line of fractional horsepower motors for jet pumps in ratings of ¼, ⅓, ½, ¾, and 1 hp is now available from General Electric Co.'s fractional horsepower motor division, Schenectady 5, N. Y.

Fully rated at the top of their horsepower torque bands in conformance with present NEMA standards, the new motors are equipped with ball bearings and a tapped hole is provided in the top end shield for the attachment of a drip cover.

These motors are said to be adaptable for either horizontal or vertical end mounting. Two lines are available, one with plain shaft extension for coupling to a stub shaft on which the impeller is mounted, and one with threaded shaft extension for direct mounting of the impeller. Operating characteristics are said to match pump requirements.

Fastens Pipe Hangers to Concrete or Metal

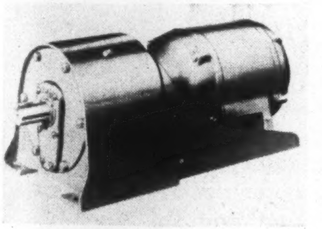


No. 3950—A small, portable tool utilizing a powder actuated driver for "pinning" a pipe hanger to a concrete ceiling or wall, a steel I beam or column, or for fastening wood to concrete or steel has recently been developed. The manufacturer is Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8.

The tool is designed to embed studs in steel or masonry by the discharge of a blank cartridge. According to the company, two diameters of studs, ⅜ and ¼ in., may be used by interchanging the barrel of the 5 lb tool and once embedded, the studs have a holding power up to several thousand pounds.

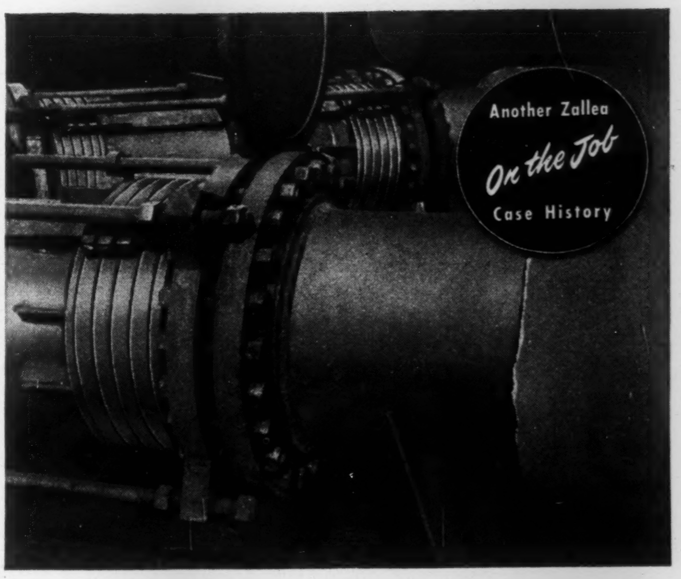
"Every conceivable precaution" is said to be incorporated in this tool which is a smaller copy of the original driver developed by the company for the U.S. Navy in connection with repair and salvage work.

Motor Speed Reducers Feature New Housing, Other Changes



No. 3951—The Falk Corp., Milwaukee 8, is offering a new line of all steel "Motoreducers" said to retain the design features of the units placed on the market over 16 years ago and to incorporate many additional improvements.

The new housing is designed with smooth contours and generous sections so as to minimize the possibility of accidental damage. In addition, it is equipped with a new dirtproof and moistureproof seal to protect gears



Where Dependability is a "Must"

BIG refinery operation requires only the best equipment . . . for assurance of dependable, long-lasting service. That's why Zallea Expansion Joints were the logical choice for installation in the vacuum flasher at the Shell Oil Company Refinery at Wood River, Illinois. Shown above are 24″ Zallea Universal self-equalizing stainless steel expansion joints used in the transfer lines. These joints absorb 6″ axial, 2″ lateral movement horizontally and 1½″ lateral movement vertically, and carry a mixture of hydro-carbon liquid and vapor flowing at 800° F. The entire vacuum flasher installation also includes 48″ Zallea stainless steel joints in the vapor lines and 8″ Zallea stainless steel joints in the bottoms line.

It's the high quality built into every Zallea Expansion Joint that makes them long-lasting—even under the severest service. Remember, there is *no* packing to deteriorate . . . *no* maintenance required. There's a Zallea Expansion Joint for almost every requirement. Available in diameters from 3″ to 72″ for temperatures from sub-zero to 1600° F. . . . for pressures from vacuum to 300 psi in standard designs and up to 1000 psi in special designs. Write today for your copy of Catalog 47. Zallea Brothers, 816 Locust Street, Wilmington 99, Delaware.

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EXPANSION JOINTS

WORLD'S LARGEST MANUFACTURERS OF EXPANSION JOINTS EXCLUSIVELY

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• WASHING
• RINSING
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SPRAY NOZZLES

INVOLUTE-TYPE FOR HOLLOW CONE SPRAY
FAN-TYPE FOR FLAT SLICING SPRAY

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for Bulletin N-616.

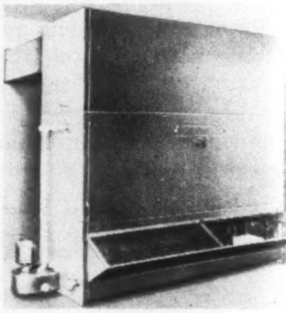
YARNALL-WARING COMPANY
107 Mermaid Avenue Philadelphia 18, Pa.

and bearings. Shaft diameters have been increased to provide greater torsional strength and a considerable increase in overhung load capacity.

The complete line includes horizontal and vertical units in both integral and all-motor types for floor, wall, or ceiling mounting. The new all-motor unit has been designed to accommodate any make or type of foot mounted motor, the motor supports being jig drilled for standard NEMA motors. The integral unit uses NEMA flanged motors intact.

The units are recommended for driving mixers, agitators, pumps, dust collectors, screens, vats, fans, washers, etc. Standard speeds may be obtained down to 1 rpm.

Evaporative Condensers Use Both Air and Water Spray

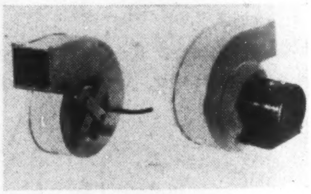


No. 3952—Eight new evaporative condensers, having capacities from 2 to 50 tons and utilizing both air and a water spray, have been announced by Frigidaire Div., General Motors Corp., Dayton 1, Ohio.

These new models are used as separate, remotely installed units and are used with matched compressors. In comparison to condensers utilizing circulating cooling water they are said to reduce the water consumption by as much as 90 percent and to solve water disposal problems where drainage facilities are limited. Recommended applications include hotels, institutions, theaters, stores, offices, and other business houses.

Fans are used to draw air into the unit through an intake grille and, at the same time, water is sprayed into the air stream wetting the surface of the condensing coil. All coils are of the primary surface type and are of either steel or copper, except in the 2 ton unit which utilizes copper tubing with brass fins. Multi-blade blowers are die formed and the motor mountings permit belt adjustment. The open impeller, vertical type water pump is completely submerged and the low pressure spray nozzles are of bronze.

Offers Small Centrifugal Fan for Many Applications

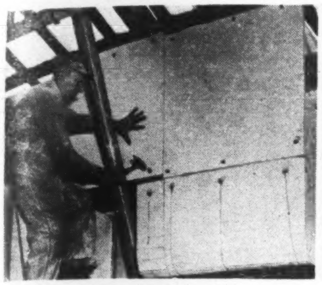


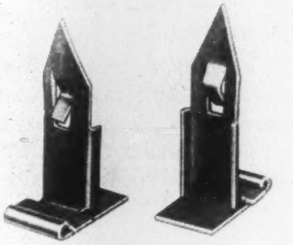
No. 3953—A line of small centrifugal fans, type 5CB, with a wheel diameter of 5 in. is designed to provide a wide selection of capacities for cooling and ventilating needs. Units are available in single or double width types from Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago 7.

According to the company, fans can be supplied with a wide range of motor sizes, motor size and speed being determined by the air required and the application. The concentric motor mounting is said to provide a compact unit of unusual efficiency. Brackets and mountings can be supplied to meet needs of any application. The fans are particularly recommended for cooling electrical and electronic equipment.

Fastens Insulation to Sheet Metal

No. 3954—The new "Lexsuco" insulation clip is said to be a quick-drive fastening which consists of a sharply pointed steel shank with a flat head and a special locking device. The manufacturer is Lexington Supply Co., 106 Lexington Ave., Cleveland.





A hammer is used to drive the point of the hardened shank into the sheet metal. Two shoulders on the clip are designed to prevent penetration beyond the thickness of the insulation and the locking device, stamped into the shank, is used to secure the clip in place.

Clips are available in standard sizes for insulation up to 1 in. thickness and are said to be suitable for use on any metal thickness up to 18 ga.

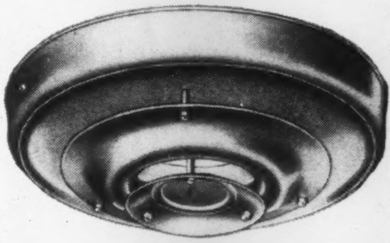
Water Pump Systems Designed for Shallow, Deep Wells

No. 3955—A line of water pump systems designed for both shallow and deep wells has been developed by Ingersoll-Rand Co., 11 Broadway, New York City.

Operating on the jet principle, the pumps are said to be suitable for many applications, including clubs, resorts, and hotels where city water mains are not available. They may also be used in small factories, dairies, laundries, etc.

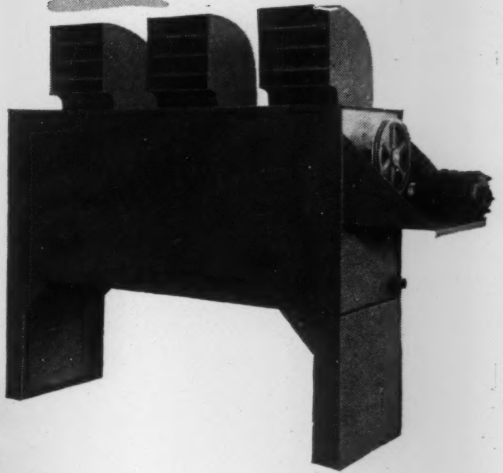
Three types of pumps are included in the line. The vertical deep well pump, for lifts up to 90 ft, operates with a 1/4, 1/3, or 1/2 hp motor and delivers from 215 to 625 gph, depending on motor size and depth of water level. The horizontal deep well pump, operating with a 3/4 or 1 hp motor, is designed for higher lifts and greater water delivery. The 1 hp model provides from 160 gph at its maximum lift of 120 ft to 1270 gph at 20 ft. The shallow well unit, for lifts of not more than 25 ft, incorporates a jet assembly built into the casing. It is self priming, is available with either a 1/4 or 1/2 hp motor, and operates at a capacity of from 275 to 1000 gph.

Offers Ceiling Air Diffusers for Commercial Applications



No. 3956—The Aladdin Heating Corp., 2222 San Pablo Ave., Oakland, Calif., is offering a line of ceiling diffusers under the name "Fuseair."

According to the manufacturer, these units are designed primarily for commercial application and are furnished in types for supply only or for



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Think FIRST of AIRTHERM

Code Tested & Approved Steam Unit Heaters to Meet Every Requirement.

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- **Vertical Discharge Unit Heaters**
- **Blower Fan Type Unit Heaters**

Airtherm Unit Heaters are available in a complete range of sizes and capacities with Code Tested ratings. Recommended by leading architects and contractors. Sold through recognized wholesalers. For complete details and name of your nearby wholesaler, write.

For Dependable Service, It's Wise to Buy from Your Jobber.

AIRTHERM MANUFACTURING CO.
711 SOUTH SPRING AVE. • ST. LOUIS 10, MO.

DIRECT FIRED HEATERS
PROPELLER FAN STEAM UNIT HEATERS
BLOWER FAN STEAM UNIT HEATERS
CONVECTOR RADIATION

-87

NOTE: this message will interest plant and consulting engineers who know that an air-conditionig system is no better than the pumps employed!

where EFFICIENCY! . . . ECONOMY! . . . and DEPENDABILITY! . . . count!

A WEINMAN PUMP IS THE HEART OF THE AIR-CONDITIONING SYSTEM!

What greater proof of quality can any pump offer than its on-the-job performance record? . . . and the WEINMAN pump record for day in and day out *Dependability!* . . . *Efficiency!* . . . and *Economy!* . . . as the heart of countless air-conditioning systems, is a record to convince you that *Weinman Pumps Are "Right" For The Job* . . . made right by centrifugal specialists who know air-conditioning pump requirements.

WEINMAN TYPE "G" UNIPUMP

Especially adapted for circulation of chilled water or brine. Sizes to provide capacities of 10 G.P.M. to 1000 G.P.M., heads to 500 ft., and motor ratings ranging from ½ hp. to 30 hp.

CENTRIFUGAL SPECIALISTS

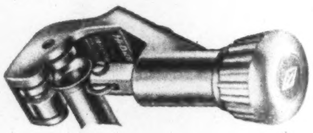
WEINMAN PUMP MFG. Company

COLUMBUS • 8 • OHIO

both supply and exhaust. They can be used for both heating and cooling and include an extended molding. It is claimed that if they are properly installed, ceiling discoloration can be virtually eliminated.

All units are fabricated from spun aluminum and are available from stock in 12 standard sizes.

Ball Bearing Action Features Tube Cutter



No. 3957—A new No. 274-F tube cutter with "free wheeling" ball bearing action is now available from Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7. The cutter is designed for use with copper, brass, aluminum, "Bundy" steel, block tin, and lead tubing, hard or soft temper, and is said to cut all sizes from ⅛ to 1 in. OD inclusive.

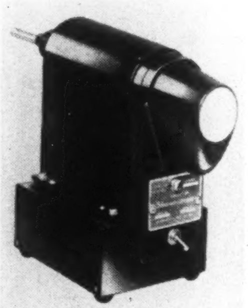
Ball thrust bearings are built into the tool to provide ease of operation and to make possible speedy size adjustment. The tubing being cut rolls on rollers and a patented flare cutoff groove in the rollers is designed to make possible the removal of a cracked flare without waste of tubing. Another feature is the retractable locking reamer for reaming tubing after it is cut. The reamer folds out of way when not in use. The overall length of the aluminum alloy tool is 4½ in. and the weight is 6 oz.

Develops Condensate Return Unit for Low Pressure Steam Use

No. 3958—Oilux Co., 2200 Dwenger Ave., Fort Wayne 4, Ind., has developed a condensate return unit for use with commercial and industrial heating and low pressure steam systems.

Designed for systems from 2000 to 12,000 sq ft E.D.R., the unit consists of a receiver tank (18 or 30 gal), a self priming, bronze fitted turbine pump, and controls which are said to provide fully automatic operation. The manufacturer's selection chart lists steam pressures up to 50 psi.

Offers Vacuum Control System for Industrial Use

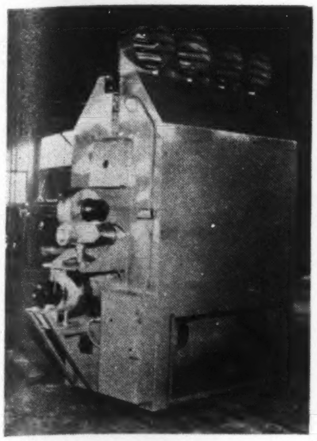


No. 3959—Utilizing a controlled gas-discharge tube as its basic sensing element, the "Skanascope" vacuum monitor has been designed for the control of vacuums in many industrial applications. The manufacturer is Skaneateles Mfg. Co., Inc., 122 Dickerson St., Syracuse 2, N. Y.

The device includes a separate sensing element, a power supply, a control panel, and relay base assemblies which allow a variety of installation techniques. Because of simple design and error-compensating features, the company claims that problems such as ambient temperature effects, false reactions to the presence of condensables, wavering due to normal line voltage fluctuations, and calibration difficulties are not encountered.

It is also stated that the monitor will exercise control over the pressure or concentration level within a system by remote automatic valve operation, by automatic graded leak, or by direct prime mover action. It is said to be uniformly sensitive to concentration changes through the 10 micron to 1 mm range and to be capable of holding a given vacuum value on dynamic systems within ± 1 micron.

Designs Direct Fired Warm Air Heater for Industrial Use



No. 3960—Arthur A. Olson & Co., Canfield, Ohio, has announced a new industrial warm air unit heater which is designed primarily for heating and ventilating of industrial and commercial buildings, but can be used for process work and for makeup air applications.

Fuel can be oil, gas, or coal. Capacities range from 300,000 to 2,000,000 Btu per hr in the gas or oil fired package unit. The stoker fired capacity ranges from 500,000 to 2,000,000 Btu per hr. The third type, a central system type, is built in capacities from 2,500,000 to 6,000,000 Btu per hr. This can be used with stoker, heavy oil, gas, or other type of fuel.

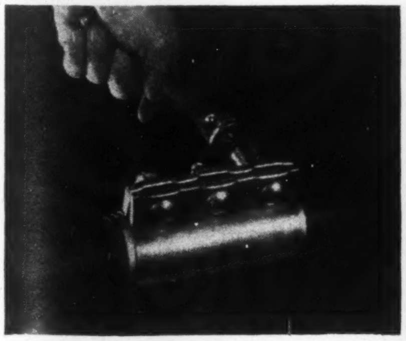
Special features are said to include four pass gas travel, the use of a separate induced draft fan, and the placing of bearings on the outside of the heater.

Pipe Mending Cement Made in Stick Form

No. 3961—Lake Chemical Co., 607 N. Western Ave., Chicago 12, has developed "Krak-Stick," a pipe mending cement in stick form.

Offered for use on piping systems handling water, gas, acids, brine, etc., it is rubbed over the crack or leak in pipes, vats, and other liquid containers. According to the company, it may be used to stop leaks due to cracks or sandholes and at gaskets and may be applied even when the liquid is in the pipes. It is also offered as a caulking compound.

Repairs Pipe Leaks



No. 3962—A new flexible steel band repair clamp is designed to snap over pipe so as to cover and stop leaks. Offered by Morris Coupling & Clamp Co., 49 Duncan Ave., Ellwood City, Pa., it is said to be excellent for emergency repair without interruption of service and to stop leakage from large and small holes, splits, cracks, and pitted corrosion areas.

In order to quickly position the clamp for tightening,

QUICK DELIVERY
STANDFORATED
PERFORATION OF ALL METALS
QUALITY PRODUCTS
FOR HEATING and AIR CONDITIONING...

newest --
finest --
strongest!
standforated

beveled edges
fabricated metal
more free air space
solid construction
no loose parts
ultra-strong oak finish, baked on for longer wear—matches flooring.

MADE IN ALL
STANDARD SIZES

FLOOR REGISTERS

COLD AIR FACES

No. 41-H "Bend-Ezy" SIDEWALL REGISTER

Sturdy construction; stamped from sheet metal. Incorporates horizontal bendable bars which are set at factory for 30 degrees downward deflection. At time of installation each bar can be easily adjusted with a "bend-ezy" tool to any desired angle for upward, downward or straight flow.
Has single damper; 3/16" turned down edge for flush installation.

Pleasingly Styled and Efficiently Designed.

FOR EVERY INDUSTRIAL USE

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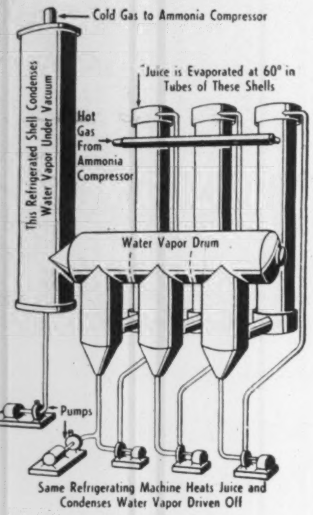

Cold Gas to Ammonia Compressor
This Refrigerated Shell Condenses Water Vapor Under Vacuum
Juice is Evaporated at 60° in Tubes of These Shells
Hot Gas From Ammonia Compressor
Water Vapor Drum
Pumps
Same Refrigerating Machine Heats Juice and Condenses Water Vapor Driven Off

New Process Uses FRICK Refrigeration for both Boiling and Freezing Orange Juice!

The plant of the Florida Citrus Canners Cooperative, at Lake Wales, is remarkable because it uses refrigeration instead of steam for concentrating fruit juices.

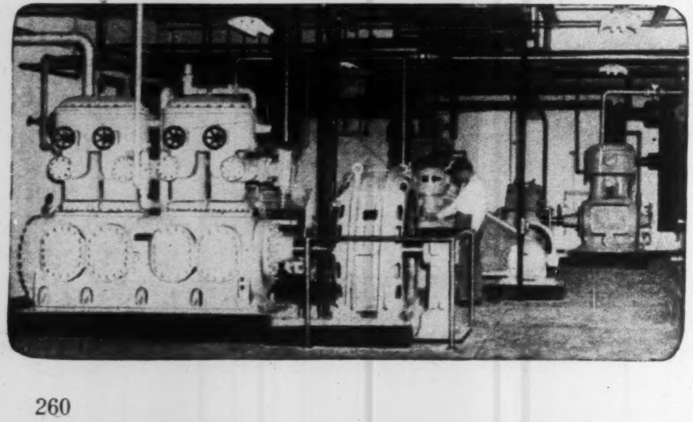
The cycle shown, on which Mojonnier Bros. Co. of Chicago have patent applications, utilizes both the heat and the cold supplied by a refrigerating machine—and with excellent economy. This principal can be applied equally well to concentrating milk, various fruit and vegetable juices, pharmaceuticals, liquid eggs, pectin and sucrose solutions, chemicals, etc. As the condensate is completely recovered, the process can also be used for distillation work.

At Lake Wales, a separate Frick refrigerating system quick-freezes and stores the concentrated and vacuum-packed juices at ten below zero. Food value and fresh flavor are both retained. Additional Frick machinery to enlarge the plant has recently been purchased.

Let us cooperate in solving YOUR particular refrigerating problems.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK Co.
WAYNESBORO, PENNA. U.S.A.

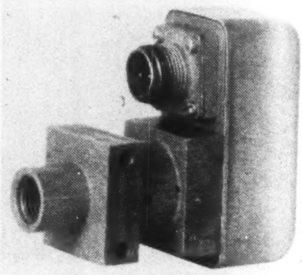
4 of 5 Frick Ammonia Compressors, Lake Wales



the inner sleeve may be rotated inside the clamp shell. To repair long cracks or splits, several clamps are butted together and the inner sleeves are placed end to end over one long gasket cut to cover the leak. Outer shells are applied so as to cover sleeve butts.

The zinc plated coupling and clamp are available for use with oil, gas, gasoline, water, air, sewage, steam, brine, and chemicals. Special gaskets are offered for rubber solvents, high temperatures, etc. Couplings are in standard iron pipe sizes from ½ to 4 in. and the clamps are from ½ to 14 in.

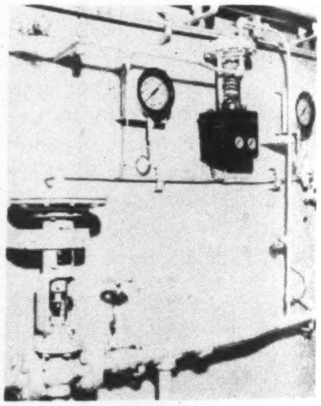
Pressure Switch Designed for Wide Range of Operating Pressures



No. 3963—Rugged construction and adaptability to different fluids with wide ranges of operating pressures are said to be outstanding features of the new No. 9048 line of pressure switches offered by Saval Co., 1915 E. 51st St., Los Angeles 11, Calif.

Designed to make or break an electrical switch in accordance with preset pressures, units can be made to operate throughout a pressure range from 100 to 5000 psi. According to the company, the device compensates for temperature changes and maintains a constant setting from —50 to 150 F. Applications are said to include automatic operation of sequencing valves, automatic control of fluid pumps, and hydraulically controlled systems of all kinds, as well as in connection with fuel oil and air conditioning systems. The switches are designed for use in connection with oil, "Freon", gas, or air service.

Provides Constant Differential Pressure



No. 3964—A differential pressure control pilot developed by Leslie Co., 51 Delafield Ave., Lyndhurst, N. J., and designated as types DD-1 (direct acting) and DR-1 (reverse acting), is designed to provide constant differential pressures for process work. The operating medium, which is used to control a diaphragm regulating valve, may be air, clean water, oil, or gas.

There are three differential pressure ranges, ½ to 6 psi, 2 to 20 psi, and 15 to 75 psi. Maximum total static pressure for all types is 300 psi—based on continuous operation and provided both pressures are maintained within the differential range of the pilot.

When controlling a differential between two pressures, the higher pressure impulse is applied to the upper side of the diaphragm of the control pilot, and the lower pressure impulse to the lower side. Turning the adjusting nut increases or decreases the differential within the adjustable range.

Equipment Shorts

A training course in industrial instrumentation gets under way the 10th of this month at the Foxboro Co. Beginning its 14th year of providing training facilities, the company has announced an enlarged program with emphasis on the selection and application of correct instrumentation for specific industries. Courses scheduled will cover a number of process industries and each course will include two weeks of study, class work, and shop practice. The program is intended for process engineers and instrument maintenance men sponsored by their respective companies.

Officials of five wholesale organizations recently took part in the third annual distributor advisory committee meeting of Herman Nelson Corp. The meeting was held for the purpose of obtaining the advice of the distributor organization on current and future company marketing policies.

A $3 million motor manufacturing plant at San Jose, Calif., which at peak production will turn out 1500 electric motors weekly, is now in operation, according to General Electric Co. Ultimately, the plant will be used to produce all of the firm's single phase, capacitor type integral motors.

Babcock & Wilcox Co. has released a new 16 mm educational film, Steam for Power, depicting the development and application of modern steam boilers. As background, the film shows early ideas in the use of steam for power and outlines the step-by-step development of the modern power plant. The sound-color film has a running time of 41 min and is available to engineering and other professional societies, engineering schools, civic organizations, etc.

Permanente Metals Corp. recently celebrated the shipment of the 500,000,000th pound of Kaiser aluminum rolled at its Spokane mills in less than two and half years of operation.

Purchases of electric motors, generators, adjustable speed drives, and controls by industry will match, and may well exceed, last year's high buying level. This is the opinion of 58 district managers and field sales engineers who recently attended a four day sales forum at Reliance Electric & Engineering Co.

A new compact seismograph has been developed by Barry Corp. and Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30. Because of its compactness and portability, it is expected that the instrument will be used to analyze vibration problems on machinery and other equipment. The first application has been made in measuring the vibration of walls in a textile mill. The device is a combination of a special seismic pendulum, developed by Barry, and the Westinghouse "Vibrograph."

K

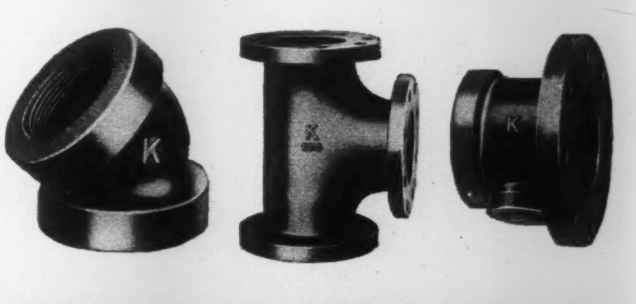
...YOUR SAFEGUARD—OUR GUARANTEE

"K" on a cast-iron fitting is the trademark of a company that has specialized on this type of product for more than sixty years. All of our efforts and facilities are devoted exclusively to manufacturing fittings which we can guarantee to be sound and accurate in every respect.

When you use "K" fittings, you are safeguarded against installation and service troubles. Precision machining assures quick, convenient make-up and tight joints. Accurate molding assures freedom from sand holes, cold checks, and thin walls.

These facts are verified by the experience of plumbers and steam fitters everywhere. If you are not acquainted with "K" fittings, it will pay you to get them the next time you order.

THE 3000 SHAPES AND SIZES OF "K" CAST-IRON FITTINGS INCLUDE:
STANDARD AND EXTRA HEAVY SCREWED FITTINGS
STANDARD FLANGED FITTINGS
STANDARD AND EXTRA HEAVY COMPANION FLANGES
DRAINAGE AND SPRINKLER FITTINGS



THE KUHNS BROS. CO.
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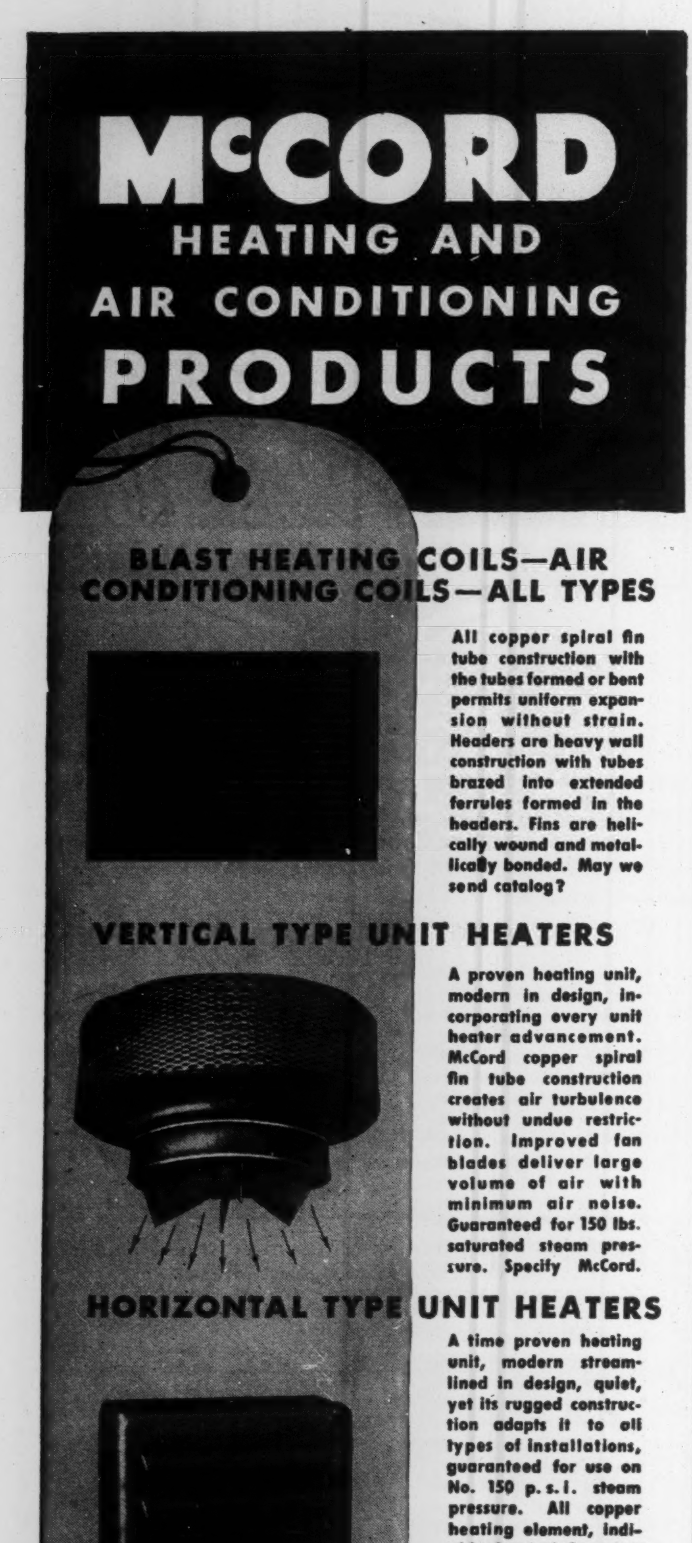
Combined Market Facilities with Malleable Iron Fittings Company
Branford, Conn., and Kuhns Bros. Co., Dayton, Ohio



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HEATING AND
AIR CONDITIONING
PRODUCTS

BLAST HEATING COILS—AIR CONDITIONING COILS—ALL TYPES

All copper spiral fin tube construction with the tubes formed or bent permits uniform expansion without strain. Headers are heavy wall construction with tubes brazed into extended ferrules formed in the headers. Fins are helically wound and metallically bonded. May we send catalog?

VERTICAL TYPE UNIT HEATERS

A proven heating unit, modern in design, incorporating every unit heater advancement. McCord copper spiral fin tube construction creates air turbulence without undue restriction. Improved fan blades deliver large volume of air with minimum air noise. Guaranteed for 150 lbs. saturated steam pressure. Specify McCord.

HORIZONTAL TYPE UNIT HEATERS

A time proven heating unit, modern streamlined in design, quiet, yet its rugged construction adapts it to all types of installations, guaranteed for use on No. 150 p.s.i. steam pressure. All copper heating element, individual spiral fin tubes free to expand without strain on joints. Standard motors with standard bases used. Wide range of capacities.

Save fuel with McCord Unit Heaters.

McCord CORPORATION
DETROIT 11, MICH.

NEW BOOKS & REPORTS

Recalculate Properties of Air, Include Data on Other Gases

To mechanical engineers, the name Joseph H. Keenan, professor of mechanical engineering, Massachusetts Institute of Technology, is virtually synonymous with basic data on thermodynamic properties of steam and air. His new book, Gas Tables, prepared in collaboration with Joseph Kaye, assistant professor of mechanical engineering at MIT, will be a welcome addition to fundamental engineering literature.

This book, superseding an earlier work by these authors published in 1945 under the title Thermodynamic Properties of Air, contains many important changes and additions. Properties of air have been reexamined and recalculated. Properties of combustion products of hydrocarbons and of the constituent gases have been added, and tables of functions useful in analyzing the flow of compressible fluids have been greatly extended.

All values of thermodynamic properties are based on the examination of data from spectroscopic sources which were published in 1945 by F. D. Rossini and his co-workers of the National Bureau of Standards. The base temperature, for which enthalpy is zero, is not the same here as in the authors' 1945 publication. It is now taken to be zero on the absolute Fahrenheit scale in accordance with Rossini's data. Negative values of properties are thereby avoided. The molal unit is used for all tables of thermodynamic properties except air. Although the major tables of thermodynamic properties may be used in analyzing the flow of compressible fluids, a number of new and more convenient tabulations are included. Some of the most valuable portions of this material, prepared by A. H. Shapiro and G. M. Edelman, have never been published except in reports of limited circulation.

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, 238 + x pages, clothbound, $5.00.

Stresses Fundamentals of Air Conditioning, Refrigeration

Refrigeration and Air Conditioning is a new book prepared to serve as a college text for senior and graduate study and as a reference for the practicing engineer. The authors, Richard C. Jordan, professor of mechanical engineering, University of Minnesota, and Gayle B. Priester, air conditioning engineer, Consolidated Gas, Electric Light, and Power Co., Baltimore, state that it is designed for a comprehensive combination course in both refrigeration and air conditioning or it may be used for courses exclusively in refrigeration.

The theoretical portions assume that the reader has studied physics and mathematics and has a basic knowledge of thermodynamics. The first three chapters serve as an introduction for they are devoted to the history of refrigeration, basic refrigeration cycles and concepts, and a review of fundamental thermodynamics. A specific attempt to segregate theory, applications, and equipment has not been made. Rather, the descriptive material, with many illustrations, follows the presentation of the theory applied to such equipment.

With respect to fundamental theory, and in addition to a review of thermodynamics, the book contains a chapter on fluid flow and heat transfer and one on psychrometrics. Refrigeration theory is covered in chapters on refrigerants, thermodynamics of vapor refrigeration, cooling load calculations, low temperature refrigeration, absorption and adsorption systems, and multiple evaporator and compressor systems. Equipment described includes compression machines, condensers, evaporators, refrigeration piping, and controls. Three chapters are devoted to applications of refrigeration, including air conditioning and food preservation.

Inasmuch as this is a fundamental text which is necessarily broad in scope, no attempt has been made to provide complete and detailed treatment of each aspect. For example, the operation of the heat pump, an explanation of its coefficient of performance, and the fundamental problem of the heat source are covered in less than three pages. However, throughout the text extensive documentation by means of footnotes has been provided and a bibliography is included at the end of each chapter. Design data in the form of tables and charts are included as are problems at the end of most chapters.

Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, 512 + xv pages, clothbound, $7.75.

Lists Preferred Sizes of Copper and Copper Alloy Seamless Tube

According to the Commodity Standards Div., National Bureau of Standards, the use of preferred sizes listed in a printed recommendation on copper and copper alloy seamless tube should enable mills to schedule longer runs with less frequent setting of tools and should generally regularize production and facilitate distribution.

Printed copies of Simplified Practice Recommendation R 235-48, Copper and Copper Alloy Round Seamless Tube are now available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. for 5c each. A discount of 25 percent will be allowed on orders of 100 or more copies.

This recommendation does not apply to copper and brass pipe, copper water tube, refrigeration service tube, and heat exchanger tube.

Tabulates Pipe Friction Data

The Hydraulic Institute has published a Tentative Standard on Pipe Friction which shows, in tabular form, the friction loss for water flowing in pipes from ⅛ to 84 in. in size. For the smaller pipe sizes, the tables are based on wrought iron or schedule 40 steel pipe, and for the larger sizes, separate tables are given for each standard size of steel and asphalt dipped, cast iron pipe. In each table, the flow in gpm and cfs is shown with the corresponding velocity, velocity head, and friction loss per 100 ft of pipe. For computing the friction loss for liquids other than water, a series of charts are included for pipes ranging from ½ to 12 in., showing the complete range of viscous and turbulent flow.

In addition to the friction tables, there is a listing of the losses in valves and fittings. The data on increasers, bends, and diffusers are shown in chart form so as

HIGH EFFICIENCY + LOW MAINTENANCE

that's **Economy** *in operation.*

Looking for a pump that will keep on pumping . . . with minimum time out for maintenance? Turn to pumps by Economy . . . performance proved . . . engineered for true economy in operation.

If you're short on space and long on pumping requirements, you'll especially like Economy SCV Pumps. Compact enough for almost any corner, these medium-priced, quiet-operating pumps are adaptable to almost any type clear liquid circulation.

Motor is high above dirt and splash. Entire rotor assembly is easily accessible . . . easily removed . . . quickly reassembled. Lower pump sleeve bearing prevents misalignment. Only one stuffing box . . . just three greasing points requiring one lubricant.

For complete details, write Dept. C-1 for Bulletin D-246.

Centrifugal, axial, and mixed flow pumps for all applications.

Economy Pumps, Inc.

Division of Hamilton-Thomas Corp.
Hamilton, Ohio

to include a range of variable dimensions. Also included is a brief review of the basis of the tables and a description of their use, including illustrative examples. To supplement the use of the standard, tabulated data are given on the viscosity and specific gravity of many commercial liquids and gases, dimensions of standard pipes, etc.

The booklet, based on a paper, Friction Factors for Pipe Flow, by Lewis F. Moody, professor of hydraulic engineering, Princeton University, (published by the American Society of Mechanical Engineers in 1944), was prepared with the help of Prof. Clifford P. Kittredge, also of Princeton.

Copies of the standard may be obtained from institute headquarters, 90 West St., New York 6, for $1.50.

Other Books and Reports Received

Bituminous Coal Facts and Figures, 1948 edition, published by Bituminous Coal Institute, 815 Southern Bldg., Washington 5, D. C. As its name implies, it contains information on bituminous coal reserves, production, distribution, consumption, mechanization, manpower, and other aspects of the industry.

Warm Air Heating Manuals—The National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland, has completed the revision of all its manuals. Those revised since December 1947 are Manual 9 on the design and installation of warm air winter air conditioning systems for buildings of more than 120,000 Btu per hr loss, and Manual 8 on classifying these systems.

Official Proceedings, 38th Annual Meeting, National District Heating Association—Available from NDHA headquarters, 827 N. Euclid Ave., Pittsburgh 6, for $5.00, this 332 page book is clothbound and contains various committee reports presented at the 1947 meeting. Technical papers deal with snow melting; the use of steam for air conditioning; the 10 in., mile long high pressure steam main in Rochester, N. Y.; operating experiences of member companies with various types of packing for slip type expansion joints; corrosion prevention through the chemical treatment of steam; and the protection of cold boilers. (See the August and September 1947 issues of HPAC for reports of this meeting.)

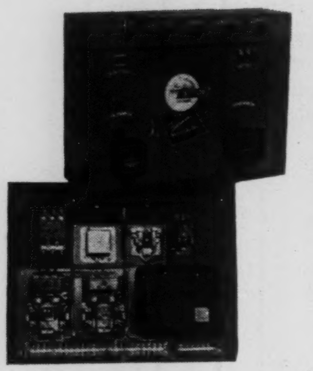
Temperature and Heat Loss Characteristics of Concrete Floors Laid on the Ground—A 50 page report (PB 93[illegible]20) dealing with a test building having nine different designs of floors and used to determine heat losses and moisture permeation. The report is available from the Office of Technical Services, Department of Commerce, Washington 25, D.C., for $1.25 and is the result of a research project conducted by the Small Homes Council, University of Illinois, for the government. A four page condensation of the report (Circular F4.3) may be obtained from the Small Homes Council, Mumford House, University of Illinois, Urbana, Ill., for 10 cents.

Directory, Stoker Manufacturers Association—Manufacturer members, associate members, officers, directors, and committees are listed in this mimeographed bulletin which is available from association headquarters, 307 N. Michigan Ave., Chicago 1, for 20c per copy.

The Perfect Oil-Burning Equipment Combination

ACE PANEL BOARD

ACE Uniflow OIL BURNER



The new all-steel Ace control panel permits rapid and efficient installation of oil burners.

It is pre-wired at the factory so that it is only necessary to supply the power and make connections on location. Wires are color-coded for ease in circuit tracing. Pilot lights indicate if burner is operating as desired.

The prefabricated panel has a number of other features that make it outstanding.

Ace burners are custom made for particular heating requirements, assuring dependable, economical, efficient applications in the commercial and industrial field.

The patented Ace Uniflow Valve permits a constant, uniform flow and flame regardless of changes in oil temperature or viscosity. The correct proportioning never varies.

SEE THEM AT THE SHOW...

See these units and other Ace equipment at Booth 321, Heating and Ventilating Exposition. Special manual available for architects and engineers.

Capacity Ranges

	Gallons Per Hour	Boiler H.P.	Square Feet Steam Rad.	Square Feet Water Rad.
Minimum	4	12	1,600	2,600
Maximum	165	500	64,000	104,000

ACE ENGINEERING CO.

1435 W. 15th Street • Chicago, Illinois

Custom Engineered Oil Burning Systems Since 1931

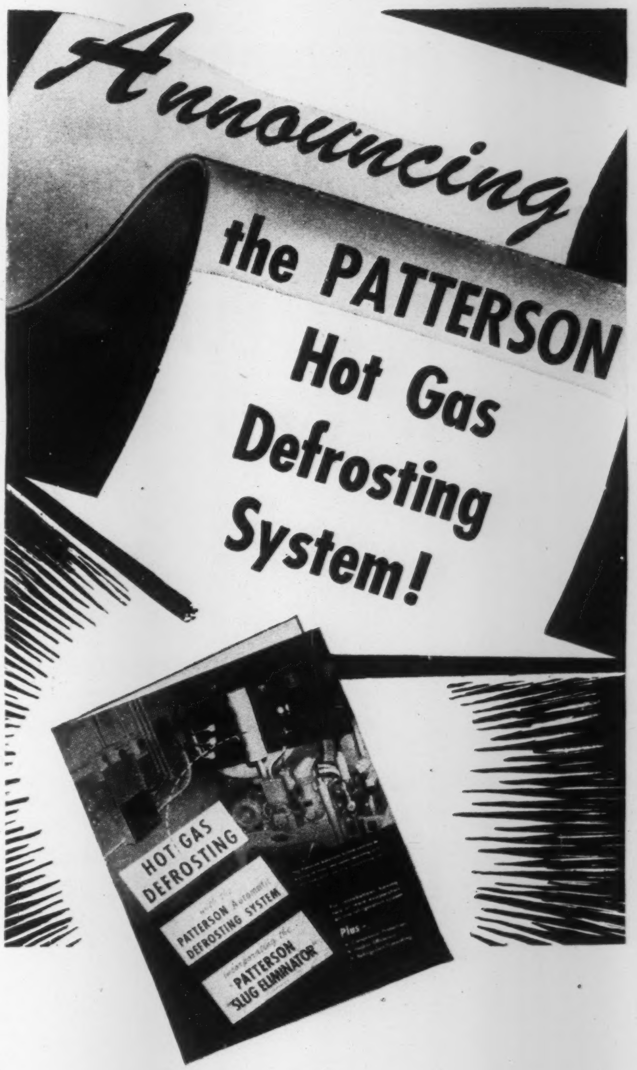
WHO'S WHAT

Thomas J. Lingle is western division manager in charge of manufacturing operations at the **Taylor Forge & Pipe Works,** new Fontana, Calif., plant, as well as director of west coast sales. He was formerly associated with C. F. Braun Co., Alhambra, Calif., and since 1946 operated his own valve and fitting business in Alhambra. ...... **John D. Rosebrough** is managing the St. Louis office of **Herman Nelson Corp.,** Moline, Ill. This branch office has recently been moved to 2188 Railway Exchange Bldg., 611 Olive St. ...... **Roy O. Nelson** has resigned as assistant sales manager, Marsh Heating Equipment Co., Skokie, Ill., and has again joined **C. H. Bevington Co.,** 330 S. Wells St., Chicago 6, manufacturers' representative, in active charge of sales.

R. J. Heier, vice president, **Air Comfort Corp.,** Chicago, distributor of Carrier air conditioning products, is in charge of wholesale operations of the firm. **Larry Shogren** has been promoted from assistant to manager of retail sales. **H. E. Wheeler,** president of the firm, is the new president of the **National Association of Refrigeration Contractors.** ...... **William T. Carmody,** former sales manager of **Sporlan Valve Co.,** St. Louis, has been appointed controller and director of customer relations. Supervision of all sales, including export, is being handled by **Charles C. Grote,** Mount Vernon, N. Y., new eastern sales manager, and **Merle G. Haynes,** St. Louis, western sales manager. **W. H. Krack,** Los Angeles, fills the vacancy on the west coast created by the promotion of Mr. Haynes.

Norbert D. Downey is now assistant sales manager in charge of the central states region of the heating and refrigeration division of **Fedders-Quigan Corp.,** Buffalo, covering the area west of Detroit to the mountains and from Canada to the Gulf. Immediate plans call for the opening of a Chicago branch with additional personnel to serve the central area. ...... **Professor Burgess H. Jennings,** chairman, department of mechanical engineering, Northwestern University, Evanston, Ill., is the new president of the **American Society of Refrigerating Engineers.** During the war, he was connected with the government's Office of Research and Development and supervised work on glycol vapor.

With headquarters at 241 Castlewood Ave., Dayton, **John H. Marling** is a field engineer covering Ohio, West Virginia, and western Pennsylvania for **Alco Valve Co.,** St. Louis. The firm is represented in Michigan, northwestern Ohio, and northeastern Indiana by **Robert W. Carvell.** .... **Phillips-Fruth Co.,** 538 N. Erie St., Toledo, is the representative in that area for **McQuay, Inc.,** Minneapolis, and **Neill Equipment Co.,** 424 Electric Bldg., Omaha, is representing the firm in Nebraska and the southwestern corner of Iowa. Both concerns are handling heating and air conditioning products. **Bernard M. Packtor,** 196 Ellsworth Ave., New Haven 11, Conn., is the refrigeration representative in the New England states, as well as New York west to Rochester and excepting the



Simple and effective, this Patterson System is ideal for defrosting installations having two or more evaporators in one refrigeration system. Operations are cyclic and can be either automatic or manually controlled. In addition to properly defrosting each evaporator, this PATTERSON SYSTEM protects the compressor by intercepting any slugs of refrigerant and changing the liquid into gas. It precools the refrigerant. It promotes higher efficiency in the system.

With proper modifications, usually it can be applied to the defrosting of a system with only one evaporator.

Back of this Patterson Defroster is an experience in the design and manufacture of equipment for refrigeration systems dating back many years. It's one of our latest contributions to progress in the industry. In sending for our new bulletin on the PATTERSON Defrosting System, give details of your installation and problem.

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WARREN STREET, EAST STROUDSBURG, PA.
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Condensation and General Application

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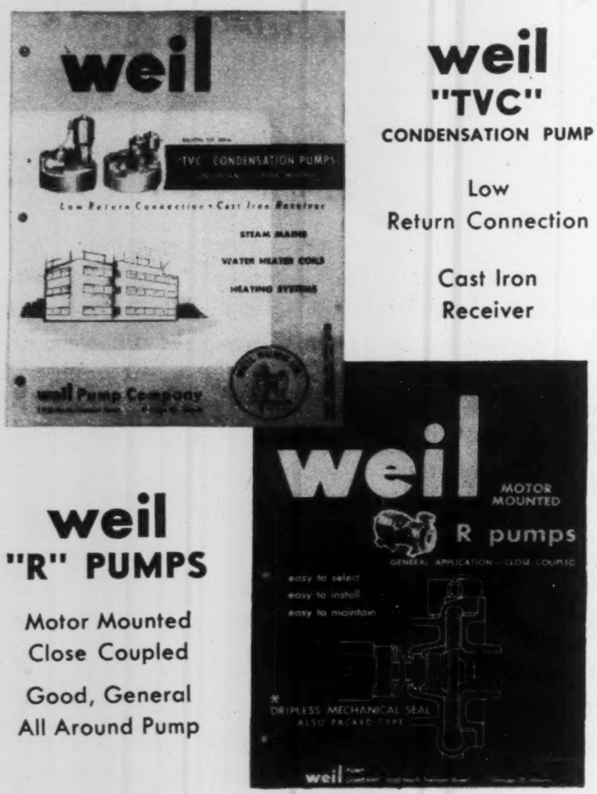

weil "TVC" CONDENSATION PUMP

Low Return Connection

Cast Iron Receiver

weil "R" PUMPS

Motor Mounted Close Coupled

Good, General All Around Pump

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Who's What (Cont.)

metropolitan area. He is also the representative r heating and air conditioning products in western Mas chusetts, Rhode Island, Vermont, and Connecticut cepting the southeastern section.

Fisher Governor Co., Marshalltown, Iowa, has pointed a number of new sales representatives in rec nt months. **Lachapelle Engineering Equipment,** 4109 t. Catherine, W., Westmount, Montreal 6, represents he firm in Quebec. **W. H. Kidd & Co.,** 309 Cowardin A e., Richmond, which covers the state of Virginia, was for ed when Mr. Kidd resigned as manager of the chem al controls division, Foxboro Co. **Clifford B. Ives and o.,** 1500 Walnut St., Philadelphia 2, is district representa ve in southern New Jersey and eastern Pennsylvania. S es in the Cleveland area are handled by **A. E. Ehrke & o.,** 5005 Euclid Ave., Cleveland 3. For the past 10 years, Mr. Ehrke has been in the sales engineering department of the home office. **Wickersham-Petty & Co.,** Park Square Bldg., Boston 16, is the new representative in that area. Mr. Wickersham formerly managed the company's office in New Haven, Conn., and Mr. Petty was in the home office sales engineering dept.

E. A. Bonneville, sales manager, room air conditioner division, **Fedders-Quigan Corp.,** Buffalo, has been elected chairman of the room air conditioner section of the **Air Conditioning and Refrigerating Machinery Association.** ...... As the new general sales manager of **General Electric Co.'s** air conditioning department, **Louis H. Matthes** is located in Bloomfield, N. J. and is responsible for field sales activities, commercial engineering, national user sales, and for the activities of the customer sales divisions. ...... The machinery division of **Dravo Corp.,** Pittsburgh, has opened a branch office at 100 N. Eutaw St., Baltimore, with **C. P. Cryer,** formerly of the Philadelphia office, in charge. ...... **John C. Barnes,** formerly vice president for sales, National Radiator Co., has joined **Rittling Corp.,** Buffalo, as vice president for sales, eastern division. At present he is making his headquarters in Philadelphia.

Norton R. Miller has joined **United States Air Conditioning Corp.,** Minneapolis, as manager of the eastern sales division which includes the New England states, part of New York state, and part of Pennsylvania. The division will continue to headquarter at the company's New York City office. Mr. Miller was formerly with the air conditioning division, Chrysler Corp., and was associated with the Trane Co. in New York for 11 years. ...... **Dr. Emil D. Ries** is manager of the ammonia dept., **E. I. du Pont de Nemours & Co., Inc.,** Wilmington, Del., succeeding **Walter Dannenbaum** who is now a vice president, director, and member of the company executive committee. ...... **Richard W. Schreck** is the Michigan divisional sales representative for **Watson-Stillman Co.,** Roselle, N. J., working out of the Chicago office. ...... With headquarters in Kansas City and covering Kansas, Missouri, Illinois, Wisconsin, Iowa, Nebraska, South Dakota, and Minnesota, **P. E. Carter** is a regional sales manager for **Typhoon Air Conditioning Co., Inc.,** Brooklyn, N. Y. He has been associated with the distribution of air conditioning equipment for the past 14 years and was formerly district representative for General Electric Co. in the Kansas City area.

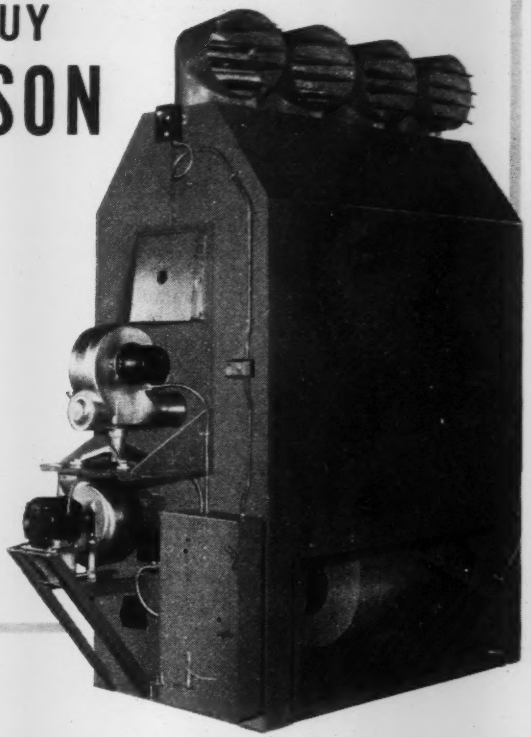
R. **C. Osborn,** chief engineer for the last year, is now vice president in charge of engineering for **Eureka Williams Corp.,** Bloomington, Ill. ...... As general sales manager for **Radiator Specialty Co.,** Charlotte, N. C., **V. P. Bresan** will coordinate sales, advertising, and merchandising activities. ...... The air conditioning, heating, and ventilating lines of **Ralph Pat Kelley and Associates, Inc.**, Florida, are being handled on the west coast of that state by **N. J. M. MacLean,** new associate whose temporary headquarters is at 2504 Prospect Rd., Tampa. ...... **M. E. Corbin,** 1450 Elbur St., Lakewood 7, Ohio, is covering Ohio, western Pennsylvania, West Virginia, and western Michigan for **Kramer Trenton Co.,** Trenton, N. J.

Night superintendent of the Ivanhoe division, **Reliance Electric & Engineering Co.,** Cleveland, for the past two years, **William J. Hall** is now the division's production manager. ...... **Marland S. Wolf,** new sales manager of **Wood Conversion Co.,** St. Paul, Minn., is the author of several books on insulation and modernization. He was formerly associated with U. S. Gypsum Co., Chicago, and has spent more than 19 years in the insulation and building products field. ...... **Lincoln Electric Co.,** Cleveland, has made a number of changes in its district managers. **C. W. Lytton,** 1700 Niagara St., Buffalo, is manager for that area. He has been with the company since 1931 and was formerly manager in the northwestern Pennsylvania district. **C. M. Richardson,** 741 Liberty St., Franklin, Pa., has taken over this district and is succeeded as manager of the Toledo district by **Ray Zeh,** 663 Spitzer Bldg., Toledo. Mr. Zeh has been with the company for 10 years in the Milwaukee office.

Harold B. Donley, as manager of marketing of the air conditioning dept., **General Electric Co.,** Bloomfield, N. J., is directing sales and merchandising activities. The new manager of the department's automatic heating division is **Henry M. Brundage,** Bloomfield, and the company's silicone manufacturing plant at Waterford, N. Y., is now managed by **Dr. James R. Donnalley** who joined the company in 1943 shortly after receiving his Ph.D. ...... **John E. Hansler,** eastern regional field engineer since 1938 for **Delco Appliance Div., General Motors Corp.,** Rochester, N. Y., is west coast regional manager for sales of the division's heating equipment, water systems, and electric motors.

H. **Blake Thomas,** general sales manager of **McQuay, Inc.,** Minneapolis, has been elected chairman of the low side product section of the **Refrigeration Equipment Manufacturers Association.** REMA is now gathering and distributing monthly sales figures on low side equipment, with all firms of the product section reporting. ...... **G. A. Heuser,** president of **Henry Vogt Machine Co.,** Louisville, Ky., is the new treasurer of the **Air Conditioning and Refrigerating Machinery Association.**

IF YOU'RE BUYING **HEAT**
BUY
OLSON



OLSON PAYS OFF IN PERFORMANCE

The Olson is a completely automatic direct fired heater designed to deliver up to 85% overall efficiency. Olson heaters are designed to heat adequately and economically any size building—industrial, commercial or public. Capacities range from 300,000 to 6,000,000 B.T.U. The unit may be operated on gas, oil or coal.

Olson heaters will do your heating job and do it with less maintenance over a longer period of time! All bearings and other vital parts are accessible without dismantling the unit. Accessories are standard, well-known makes instantly available at all dealers.

Installation is easy, too. The unit may be hung, suspended horizontally or inverted. Special applications include process and make-up air, filtering and humidifying.

Write for your copy of catalog BE-848 today.

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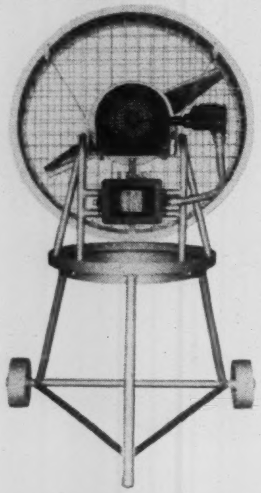
Aerospot and Dynaflow

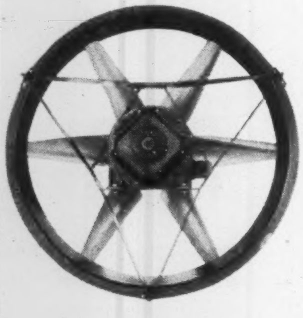
FANS FOR EVERY INDUSTRY

Aerospot and Dynaflow Fans rate high in efficiency and safety features and offer advanced aerodynamic design and rugged construction. The models shown are in most demand for Industrial use. Any unit may be furnished with explosion-proof motor and fan blades. For complete specifications, and listings of other fans available, write for our new catalog today!



HEAVY DUTY AEROSPOT

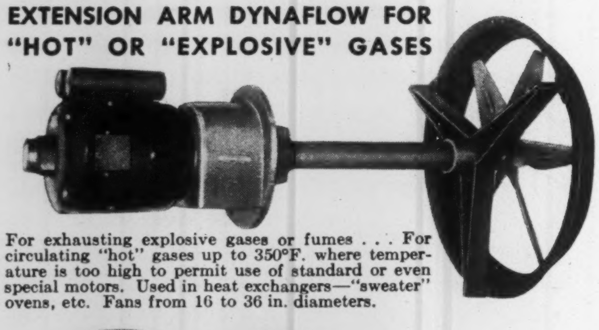
For general or specific ventilation, man-cooling, or parts-cooling—to increase personnel efficiency and decrease lost time in cooling and drying hot parts. Portable. Direction of blast adjustable. Explosion-proof motor, metal conduit and starter can be supplied. Conforms to state safety regulations.



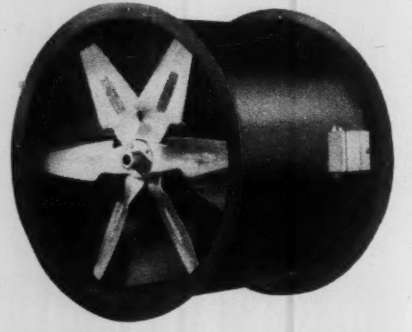
DYNAFLOW UNITS 2-4-6 BLADE TYPES

Six Blade model illustrated. For exhausting or blowing against high static pressures. For general ventilation or specific processes where fumes are present. Sizes: 16 to 36 in. dia. Capacities: 1240 to 26000 c.f.m. Two and four blade models for applications at lower static pressures.

EXTENSION ARM DYNAFLOW FOR "HOT" OR "EXPLOSIVE" GASES



For exhausting explosive gases or fumes . . . For circulating "hot" gases up to 350°F. where temperature is too high to permit use of standard or even special motors. Used in heat exchangers—"sweater" ovens, etc. Fans from 16 to 36 in. diameters.



DUCTYPE UNITS
Direct Drive or Belt Drive

Direct drive model shown; also supplied with belt drive for high temperatures or corrosive air and gas handling. Designed for bolting in any duct run at any point or at either end. Sizes 16 to 36 in. fans.

SOUTH BEND AIR PRODUCTS, INC.
322 EAST COLFAX AVENUE • SOUTH BEND, INDIANA

MEETINGS & CONVENTIONS

American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York City—the 55th annual meeting, January 24 to 27, 1949, Stevens Hotel, Chicago.

For complete details see the special Show Section in this issue.

Ninth International Heating, Ventilating, and Air Conditioning Exposition, January 24 to 28, International Amphitheatre, Chicago—For complete details see the special Show Section in this issue.

American Standards Association, 70 E. 45th St., New York 17, has announced that a private five day seminar on standardization work, particularly in individual companies, will be held, January 24 to 28, in room 503, Engineering Societies Bldg., 29 W. 39th St., New York City. The seminar will consist of 10 conferences and will be conducted by Dr. John Gaillard, mechanical engineer on the ASA staff and lecturer at Columbia University. Detailed information can be obtained by writing to Dr. Gaillard at 400 W. 18th St., New York 27, or at ASA headquarters.

National Heating Wholesalers Association, 239 Water St., Pittsburgh—annual convention and membership meeting, January 25, Blackstone hotel, Chicago.

Stoker Manufacturers Association, 307 N. Michigan Ave., Chicago 1.—General membership meeting, January 27, La Salle hotel, Chicago. An afternoon business session for members and associate members will be followed by a reception and dinner to which representatives of allied industries will be invited.

American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.—the following 1949 meetings have been scheduled:

Spring meeting and ASTM committee week, Edgewater Beach hotel, Chicago, February 28 to March 4.

Fifty-second annual meeting, Chalfonte-Haddon Hall hotel, Atlantic City, June 27 to July 1.

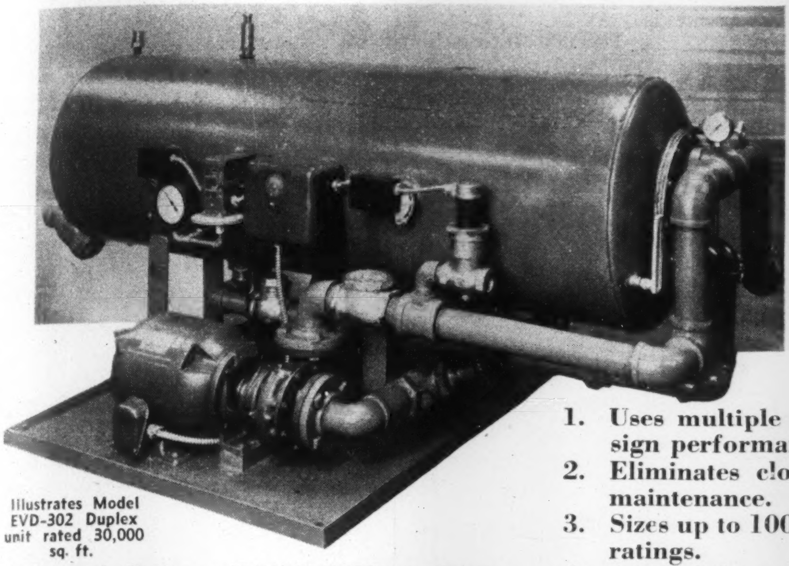
First national meeting of the society on the west coast, Fairmont hotel, San Francisco, October 10 to 14.

National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland 14—Indoor Comfort Conferences will be held during February, March, and April in 10 cities located in Michigan, Indiana, Illinois, Minnesota, Nebraska, Missouri, New York, and Ohio. Each of the conferences (warm air heating schools) will consist of a three day instruction program.

Chicago Production Show, March 14 to 17, Stevens hotel Chicago.—Edward C. Bowman, 8 S. Michigan Ave., Chi-

▶ ▶ ▶ *Featuring the . . .*

EAGAN
VACUUM HEATING
PUMP



Illustrates Model EVD-302 Duplex unit rated 30,000 sq. ft.

1. Uses multiple jet principle, prolonging indefinitely design performance.
2. Eliminates close clearance air pump thus minimizing maintenance.
3. Sizes up to 100,000 sq. ft. and 60 P.S.I., per A.S.H.&V.E. ratings.
4. Accessibility of all parts assures better care, lower upkeep.
5. Apexior lined receiver, gives long life, greater storage.

Write for bulletins on EAGAN PUMPS including

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- BOILER FEED
- TURBINE
- CENTRIFUGAL

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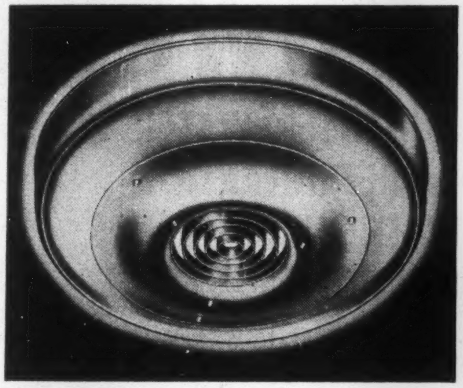

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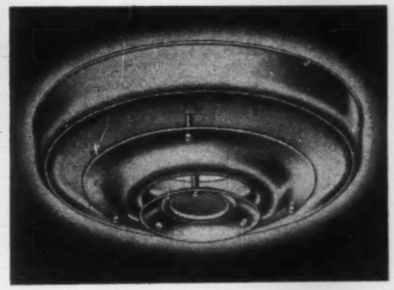

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● The problem of ceiling discoloration has been effectively minimized by the development of Type "SE" FUSEAIR. The extended moulding design-feature of this unit will assure your customers a tremendous saving in redecorating costs.

ALADDIN HEATING CORPORATION

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Meetings & Conventions (Cont.)

cago 3, is general manager of the show which is sponsored by the Chicago Technical Societies Council.

The 11th Midwest Power Conference, April 18 to 20, Sherman hotel, Chicago.—Sponsored by Illinois Institute of Technology, 3300 S. Federal St., Chicago 16. Conference secretary is Dr. E. R. Whitehead, director, electrical engineering dept., Illinois Tech.

American Foundrymen's Society, 222 W. Adams St., Chicago—1949 annual meeting, May 2 to 5, St. Louis, Mo.

Oil-Heat Institute of America, 6 E. 39th St., New York City—1949 national convention and National Oil-Heat Exposition, May 16 to 20, Boston. Convention headquarters will be the Statler hotel and the exposition will be in Mechanics Hall.

National District Heating Association, 827 N. Euclid Ave., Pittsburgh 6—40th annual meeting, New Ocean House, Swampscott, Mass., May 24 to 27.

American Society of Refrigerating Engineers, 40 W. 40th St., New York City—Spring meeting, June 5 to 8, aboard ship during a cruise from Montreal on the St. Lawrence and Saguenay rivers.

The 4th International Gas Conference, June 15 to 17, London, England—sponsored by the International Gas Union, comprised of national gas associations throughout the world. Additional information may be obtained from the American Gas Association, 420 Lexington Ave., New York 17.

American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York 10—1949 semi-annual meeting, June 20 to 22, Minneapolis.

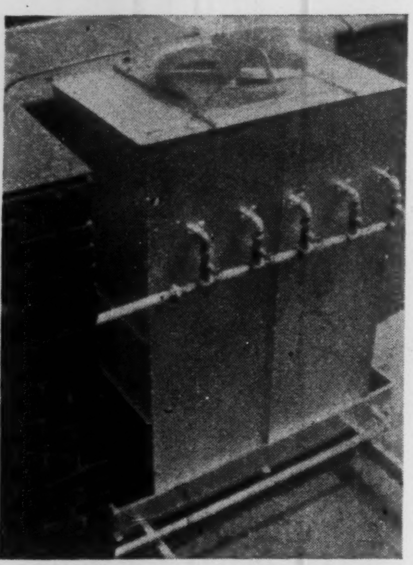
Instrument Society of America, 1117 Wolfendale St., Pittsburgh 12.—The 1949 conference and exhibit will be held in St. Louis, September 12 to 16. The 1950 convention and exhibit will be held in Buffalo, September 11 to 15.

Sixth All-Industry Refrigeration and Air Conditioning Exposition, the week of November 14, 1949, Atlantic City—sponsored by the Refrigeration Equipment Manufacturers Association, 1107 Clark Bldg., Pittsburgh 22, Pa.

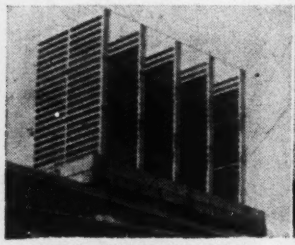
HPAC's directory section of equipment begins on page 293 of this issue.

TRAY COOLING TOWERS

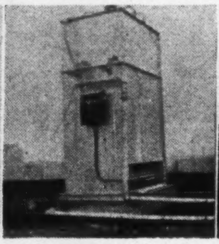
SAVE 98% of CONDENSER WATER COSTS
wasted thru REFRIGERATION
and AIR CONDITIONING PLANTS



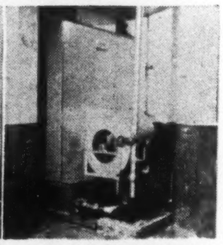
COOLING TOWER ABOVE—40 Tons Refrigeration Capacity. 120 GPM. Induced Draft—Outdoor Unit.



ATMOSPHERIC UNIT WORCESTER, MASS.



INDUCED DRAFT COOLING TOWER, PHILA., PA.



INDOOR COOLING TOWER, BROOKLINE, MASS.

TRAY COOLING TOWERS *offer*

- ★ ALL STEEL CONSTRUCTION
- ★ PACKAGE UNITS—REQUIRE LESS SPACE
- ★ OPEN DISTRIBUTOR HEADER — NO NOZZLES requires less horsepower for recirculating pumps.
- ★ INDOOR and OUTDOOR UNITS

Send for BULLETIN H-48

Some open territory for factory representatives

NEW ENGLAND COOLING TOWER CO.
88 Broad Street
BOSTON 10, MASS.

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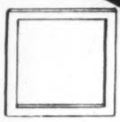
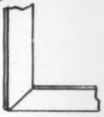
Air Filters

These EXTRA Aircor Features Mean EXTRA Filtering Efficiency

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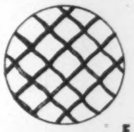
FULL BRONZE WELDED CORNERS



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EXPANDED METAL FACE PLATE

Media of Aircor Air Filters is viscous type, permanent and cleanable. Constructed of multiple layers of galvanized wire mesh, media is designed to give maximum efficiency plus large dust holding capacity at low resistance. Expanded metal face plate acts as lint arrestor — distributes air evenly over entire filtering area, and aids in easier cleaning and servicing.

Available in standard 1" and 2" thickness, or for industrial and special applications in 2" to 4" thickness. Holding frames for all type filters for V type or straight banks.

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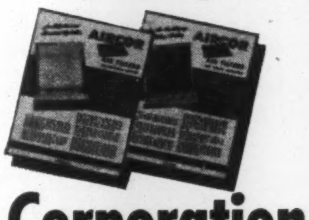


Air Filter Corporation

108-F North Water St., Milwaukee 2, Wis.
Canadian Representative
DOUGLAS ENGINEERING CO., LTD. MONTREAL

CASE REPORT No. 51 from a series of actual cases recording the successful application of "BEAR" DY-NAMIC BALANCING to Industry.

"Bear" Balancing Machine (foreground) determines unbalance. Operator then uses drill press to remove excess weight which causes unbalance.

250 to 300 ROTORS
per day Dy-Namically Balanced

PEZZILLO PUMP CO., PHILADELPHIA, PA., reports: "Bear" Dy-Namic Balancing Machines are easy-to-operate, trouble-free, fast in production! We notice greater quietness, smoothness of operation and better performance of our electric motors since rotors are Dy-Namically Balanced. Average unit is Dy-Namically Balanced in approximately 1½ minutes by "Bear" Method.

NOW— DY-NAMIC BALANCING with assembly-line *Speed!*

. . . for many Heating, Piping and Air Conditioning applications

The revolutionary "Bear" Dy-Namic Balancing Method is so simple, so fast, so easy-to-learn, that manufacturers, maintenance shops and others throughout industry are employing it with top-production results. Installation and operation of "Bear" Dy-Namic Balancing Machine need not interrupt routine production . . . easily adapted to any operation.

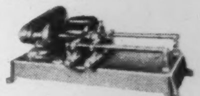
Increase value and sales appeal of your product with rotating parts that are in Dy-Namic Balance! Initial capital investment and cost-per-unit are surprisingly low!

get *ALL* the *FACTS!*

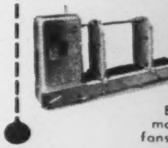
FREE Dy-Namic Balancing MANUAL

Actual case studies from many phases of industry illustrate how Dy-Namic Balancing reduces wear on rotating parts, eliminates noise and vibration and improves efficiency of finished product. Get your FREE DY-NAMIC BALANCING MANUAL by writing to Bear Mfg. Co., Dept. H-16 Rock Island, Illinois.

THERE'S A "BEAR" DY-NAMIC BALANCING MACHINE for rotating parts weighing from 4 oz. to 8 tons!



High Speed Model 337-V
for Dy-Namic Balancing of very small armatures, shafts, etc



Model 375-R
for Dy-Namic Balancing of air moving bodies like fans, propellers, etc

Model 400-R
for Dy-Namic Balancing of railroad wheels, giant motor armatures, etc

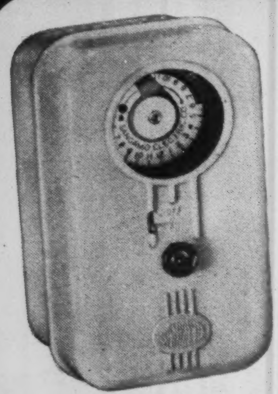
See Dy-Namic Balancing Manual for other models

BEAR

STATIC AND DY-NAMIC BALANCING MACHINES

2968HP

Trade Mark Registered U. S. Patent Office for positive time control

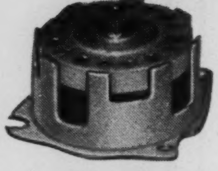


Sangamo Type S Time Switch—This compact, single pole, single throw switch offers precision in miniature. Extremely attractive in appearance, it will suggest many "upstairs" installations. It is adaptable to switchbox mounting.

SANGAMO
TIME SWITCHES

Sangamo Type L Time Switch—A high quality, heavy-duty, synchronous time switch for more extensive use. It can be equipped with an omitting device to provide daily shutoff periods.

New Hysteresis-type Motor



This Sangamo-developed, low speed hysteresis-type motor, used in all Sangamo Time Switches... offers greater torque...long-life lubrication...low speed: 450 RPM... features that assure exceptionally long life without attention.

See our display at the 9th International Heating and Ventilating Exhibition... Space Number 446.

ST491

Sangamo Electric Co., Springfield, Ill.

RECENT TRADE LITERATURE

For your convenience in obtaining copies of these bulletins, see coupon on page 247. If you write direct to the manufacturer, describe carefully what literature you want, as the number given first in each item is for use only when sending requests to Heating, Piping & Air Conditioning.

Air Diffusers

No. 7083—A new four page folder, prepared by Leonard Phillips, consulting engineer, and entitled Major Ventilation Objective: Air Movement Without Draft, has been released by Anemostat Corp. of America, 10 E. 39th St., New York 16. Describing the progress made in air diffusion as applied to schools and other buildings, the article covers the use of sidewall and ceiling type units offered by the company. Information is given on the basic requirements of a draftless system and some emphasis is given to the advantages of mechanical ventilation as compared to natural ventilation.

Arrangement of Air Dryer in Conditioning System

No. 7084—Datagram S.G.D. 4, issued by the Industrial Div., Bryant Heater Co., 1020 London Rd., Cleveland 10, contains a diagram and a discussion of a typical arrangement of equipment in an air conditioning system utilizing the company's dryer. According to the manufacturer, this arrangement, which incorporates a cooling coil to handle the ventilation latent load and a dryer for the remaining latent load, not only provides independent control of temperature and humidity but is applicable to most any air conditioning job and may be used to improve the performance of existing systems and increase overall capacity.

Cast Iron Heating Boilers

No. 7085—Detailed information on cast iron header type boilers, as well as cast iron water tube type heating boilers is contained in a 16 page bulletin released by H. B. Smith Co., Inc., Westfield, Mass. Units are said to be suitable for use with coal, gas, or oil and may be either automatically or hand fired. They are recommended for use in commercial and industrial installations. Also included is information on new automatically fired cast iron boilers which are equipped with emergency coal burning equipment. Sterling fin tube radiators and baseboard convectors are described and illustrated.

Cleaning and Handling Ball Bearings

No. 7086—Hints on the handling of ball bearings when new and on their cleaning when removed during overhaul are included in an article in the November issue of "The Dragon," published by the Fafnir Bearing Co., New Britain, Conn. This issue also gives articles on the use of ball bearings in outboard motors, motorized prime movers, and machines for contour boring and turning.

SEND FOR THIS

VALUABLE BOOKLET . . .

"RADIANT HEATING and COOLING"

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Made up of articles and data on this subject that appeared originally in "Heating, Piping & Air Conditioning," this booklet is the most comprehensive and authoritative collection of information on radiant heating and cooling yet assembled. It tells exactly what radiant heating is, where it can be used, and how to design complete systems. In addition, it contains fully detailed descriptions of numerous panel heating and cooling installations.

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84 pages — 8½" x 11" — $1.00

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KRITZER RADIANT COILS . . .

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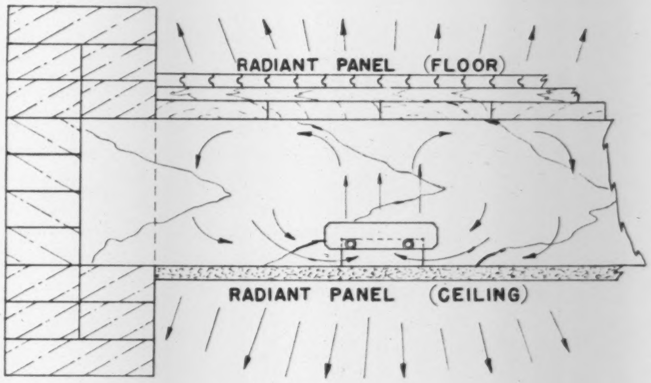
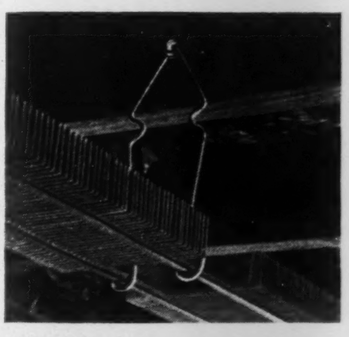
√ LOW FIRST COST
√ LOWER INSTALLATION COST



The Principle

Radiant heat "The Kritzer Way" is a new and improved method giving the many advantages of radiant heat with low first cost and lower installation costs. Available in standard lengths of approximately 10′ with finned sections to fit 12, 16, and 24" joists or stud spacings, the coils are constructed of two parallel runs of ⅝" copper tubing on 3" centers. The aluminum fins are 1½" x 6" and are mechanically bonded to the tubing.

Kritzer Radiant Coils may be used with wall, floor, or ceiling panels and are designed to heat the air in the enclosed ceiling joist spaces or wall spaces to provide a radiant panel to the living areas. Check with us now on your requirements . . . see for yourself how Kritzer Radiant Coils will enable you to install radiant heating quickly and economically.



The Kritzer "Red Head" Hanger assures accurate positioning of hangars on joists.

"IF IT'S KRITZER, IT'S RIGHT, SIR!"

KRITZER RADIANT COILS, INC.
2901 Lawrence Ave., Chicago 25, Ill.

Combination Air and Water Cooled Refrigeration Condenser

No. 7087—Don't Let the Well Run Dry is the title of an article, by Edward Stevenson, which has been published by Heat-X-Changer Co., Inc., Brewster, N. Y. Quoting a number of popular magazines, the author leads off with a discussion of water supply problems in a number of localities, tells how water levels have fallen in some cities, and very briefly mentions the restrictions which have been enacted in Washington, D. C. The remainder of the article is devoted to an explanation of the savings which could be expected (in regard to cooling water used in air conditioning and refrigeration jobs) by the use of the company's combination air and water cooled condenser.

Control of Daylight Through Glass Block

No. 7088—A new 16 page booklet on the control of natural daylight through the use of functional glass block fenestration has been published by Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh 22. The proper selection of glass block and its usage for light direction and for diffusion are described and a nomograph for estimating illumination levels is included.

Coupling Selector

No. 7089—A new "Steelflex" coupling selector has been prepared by Falk Corp., 3010 W. Canal St., Milwaukee 8. Intended to be used by draftsmen, engineers, designers and others, this slide rule type instrument covers the company's couplings from size 3F up to 18 F. Selection is based upon horsepower, application, and speed at which the coupling is to travel.

Electric Control Devices for Industrial Use

No. 7090—The new general catalog of Ward Leonard Electric Co., 31 South St., Mount Vernon, N. Y., contains two indices, one for bulletins and one for price sheets, covers the company's line of industrial electric control devices, and contains engineering data such as excerpts from the National Electrical Code, definitions, NEMA specifications, etc. The numerous products covered in detail include resistors, rheostats, relays, speed regulators, push button stations, motor starters, and a-c contactors. Copies of this catalog may be obtained by writing direct to the manufacturer on company letterhead.

Handbook on Design and Construction of Fireboxes for Small Oil Burners

No. 7091—Babcock & Wilcox Co., 85 Liberty St., New York, has announced the publication of a new edition of its Firebox Handbook identified as Bulletin R-20 B. It covers the design and construction of modern fireboxes for domestic and small commercial oil burners. It is said to offer essential information on the selection of suitable materials and on design and installation.

Heating, Air Conditioning Equipment

No. 7092—The Vol. 12, No. 8 issue of Weather Magic, the house organ of The Trane Co., La Crosse, Wis., fea-

Reinhard*

700 SERIES
INDUSTRIAL
CONVERSION GAS BURNERS

"CUSTOM BUILT"
to Meet Your Specifications

The Reinhard 700 Series embodies all the latest developments in conversion burners for cast iron sectional and steel fire box boilers. The cast burner heads employ the Up-Shot principle and are made to withstand tremendous heat. Quiet in operation, they make maximum use of fuel to give real economy of operation.
Write for complete information, prices and specifications. No obligation.

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Quality products for over 47 years

60,000 to
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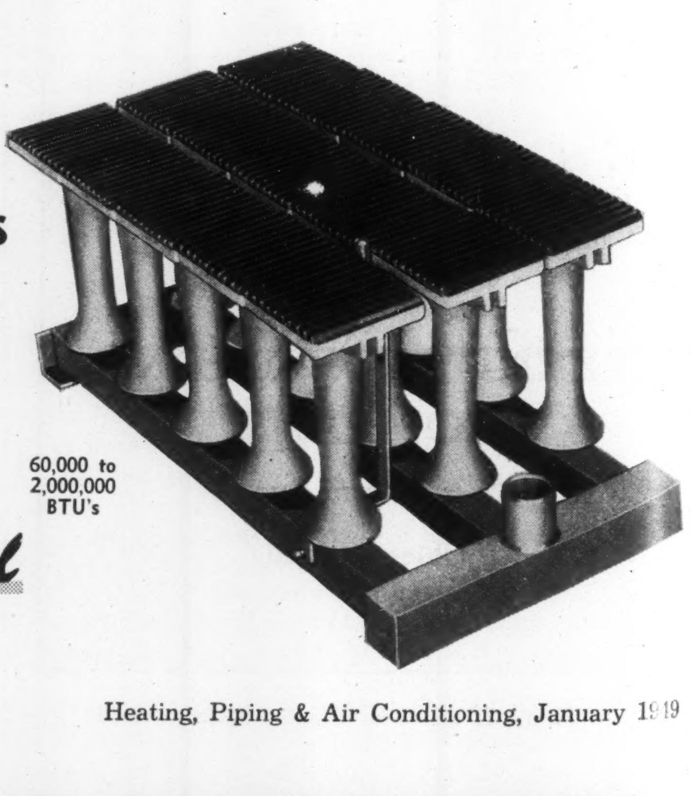

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TRADE MARK
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KRUEGER SENTRY GAUGE CO.

AT-A-GLANCE TANK GAUGES

- ✓ Accurate capacity reading
- ✓ Clear, long range visibility
- ✓ Patented, heavy duty plastic dome . . . Shockproof and breakproof
- ✓ No complicated mechanism
- ✓ Durable construction
- ✓ Withstands air pressure in excess of 100 lbs. per sq. inch
- ✓ Factory adjusted
- ✓ Guaranteed leakproof
- ✓ Underwriters' listed

CHECK THESE *Sentry* FEATURES FOR BETTER PERFORMANCE

SENTRY DRAFT CONTROLS

- ✓ Sensitive operating action
- ✓ Completely automatic operation
- ✓ Non-corrosive brass bearings
- ✓ Easy to install . . . quickly!
- ✓ Factory adjusted for accuracy
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- ✓ No servicing necessary
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- ✓ Fully warranted and guaranteed

On guard 24 hours a day!

Write for descriptive literature

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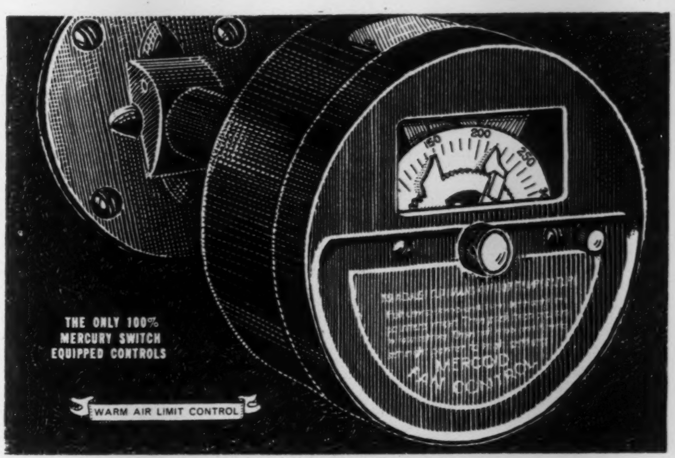
GREEN BAY • WISCONSIN



THE ONLY 100% MERCURY SWITCH EQUIPPED CONTROLS

WARM AIR LIMIT CONTROL

FOR THE HOME

THE ASSURANCE OF DEPENDABLE SERVICE BUILT IN EVERY MERCOID CONTROL

Mercoid Automatic Controls are designed for domestic oil burners and coal stokers—also for various industrial applications requiring the control of pressure, temperature, liquid level and mechanical operation.

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Automatic controls are entrusted with great responsibilities. Everything depends upon their unfailing performance. Therefore, the selection of automatic controls is a matter for serious consideration. ★ With this thought in mind, Mercoid Controls invite the most critical inspection and comparison in actual field service. ★ Mercoid Controls rank first for convenience of adjustment—dependable service and long life.

THE MERCOID CORPORATION
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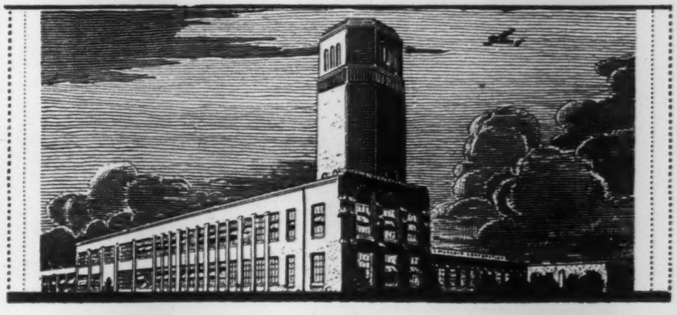
FOR INDUSTRY



tures a discussion of the air conditioning installation for the general offices of Bullard Co., machine tool manufacturer. The use of the company's "Climate Changers" to handle large areas cut up into private offices is covered. Also described is a Texas hospital for crippled children which is heated by the firm's sloping top, wall hung, convector-radiators. In the concluding article, two examples, worked out on a psychrometric chart, are used to describe the advantages of the new "Unitrane" air conditioning system.

Low Temperature Welding Alloys

No. 7093—The Vol. 5, No. 5 issue of the house organ published by Eutectic Welding Alloys Corp., 40 Worth St., New York 13, stresses the advantages of using low heat alloys for arc, torch, and furnace application, and presents case histories of eight welding problems. A reference chart for the welding of all metals lists the company's recommended alloys.

Lubricated Plug Valve

No. 7094—H. K. Porter Co., Inc., 7001 W. 66th Pl., Chicago 38, has published the first edition of its new lubricated plug valve catalog (No. 48-V). Consisting of 16 pages the booklet describes the operation and advantages of the valves and includes information on dimensions and list prices, as well as pertinent data on the size of lubricant stick, size of adaptor for pressure gun lubrication, size of wrench and locking device, etc. The company's line includes valves in all standard pipe sizes from 1 to 12 in., and available materials include semi-steel, steel, and stainless steel.

Oil Separators for "Freon" and Ammonia

No. 7095—Bulletin 15-A describes the oil separators, offered by Acme Industries, Inc., Jackson, Mich., which are designed for use with ammonia and "Freon" refrigeration systems. Discharge gas from the compressor enters the separator through a horizontal perforated manifold and then passes through a series of metallic screens. Accumulated oil passes through a float valve and is returned to the crankcase by discharge pressure. Dimensions and capacity data are included.

Packaged Boilers for Process Steam

No. 7096—"Hot Steam" packaged boilers, built by Alert Engineering Products Co., 315 W. Woodbridge St., Detroit 26, are designed for producing process steam and are available in sizes from 2 to 50 hp. They are described in bulletin 748 which includes data on sizes, weights, dimensions, etc. According to the manufacturer, these automatic units, built in accordance with the ASME Boiler Construction Code, are suitable for pressures up to 100 psi, or higher if desired. They may be used with either gas or oil burners.

Portable, Power Driven Pipe Threaders

No. 7097—A 32 page pocket sized booklet on portable, power driven pipe threaders is available from Oster Mfg. Co., E. 61st Pl. at Carnegie Ave., Cleveland 3. Short

CLIFF STEEL SECTIONAL BOILERS

FOR OIL, GAS, STOKER or HAND FIRING

Cliff Steel Sectional Boilers are designed to pass through a thirty inch wide door, permitting installation in boiler rooms inaccessible to the unit type boiler. All sections can be quickly assembled by the use of steel headers and cast steel straps and yokes. These boilers can be fired by hand (direct draft), or by using stoker fired coal, oil or gas. Unexcelled for replacement jobs, the Cliff Steel Sectional Boiler will provide years of trouble-free service, meeting every heating requirement.

Cliff
Cliff

Rating from
2100-29820 sq. ft. steam

◀ **CLIFF HEAVY DUTY STEEL BOILERS**

Cliff offers a line of steel electric welded three-pass compact firebox boilers for oil, gas, stoker or coal hand fired operation. All **Cliff** boilers are constructed to A.S.M.E. standards for fifteen lbs. steam or thirty lbs. water working pressure and are also made to comply with the new steel boiler institute code for low pressure steel boilers.

Cliff
LOLINE BOILER
Cliff
LOLINE BOILER

Ratings from 2200-42500 sq. ft. steam

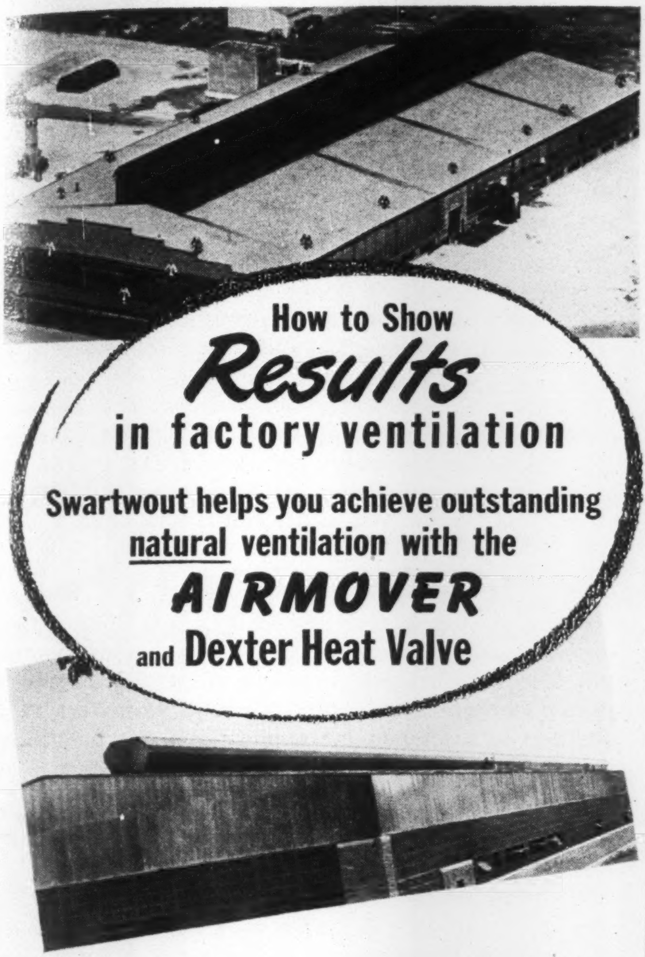
Cliff Steel Tubeauty Boilers ▶

A three-pass high firebox residential boiler designed with 3" tubes for oil, gas or stoker firing. A green enameled insulated jacket and tank heater or tankless coil can be furnished at slight additional cost.

Ratings from 800-3160
sq. ft. steam

TERRE HAUTE BOILER WORKS CO.

TERRE HAUTE Est. 1857 INDIANA



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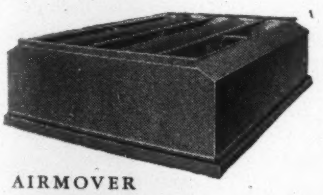
in factory ventilation

Swartwout helps you achieve outstanding natural ventilation with the
AIRMOVER
and Dexter Heat Valve

The important developments in roof ventilator design which have made Swartwout Equipment outstanding in this field mean efficient, economical ventilation for industrial buildings. The low, spreading AIRMOVER is ideal for large scale air movement—can be used to practically "open your roof to the sky"—while Swartwout-Dexter Heat Valve is "tops" for ridge, saw-tooth and skylight ventilation, widely used for over twenty years. It pays you to get Swartwout help on your ventilating problems. . . . Write for General Catalog.

The Swartwout Company
18568 EUCLID AVENUE • CLEVELAND 12, OHIO



AIRMOVER

Swartwout-Dexter Heat Valve

Swartwout
Controlled Air Circulation
EQUIPMENT FOR EFFECTIVE ECONOMICAL VENTILATION OF INDUSTRIAL BUILDINGS

Said the engineer to the president

No Maintenance Cost
Worry-Free Service
The Most Advanced Welding Process

that's why I'm specifying

Trentweld
Stainless Steel *Tubing*

On all types of piping jobs where high temperature or corrosive action must be considered, future trouble can be avoided by installing stainless steel tubing. You know that . . . but from an engineering point of view you may not be familiar with the specific advantages of Trentweld stainless steel tubing.

To begin with, Trentweld is no sideline product. It is produced in light-weight, thin-wall form in diameters from ⅛ inch to 30 inches, by a mill exclusively devoted to stainless tubing. This work-horse tubing is rolled and machine-welded by an exclusive process that makes it tougher, structurally stronger. It is sized to make-up with standard fittings for vanstoned or welded joints, provides you with tubing that makes installation work a time-saving, smooth-running job while it delivers the service you have a right to expect.

Call on Trentweld engineers, without obligation, for specific information, or write for the Trentweld Data Bulletin.

TRENTWELD STAINLESS STEEL TUBES

District Offices — Chicago, New York

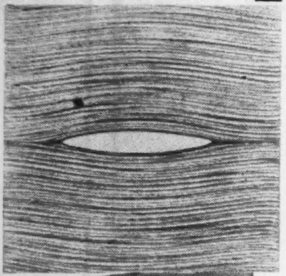
TRENT TUBE COMPANY
Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA
430 Church Street, East Troy, Wisconsin

Give your AIR CONDITIONING A CHANCE . . . with

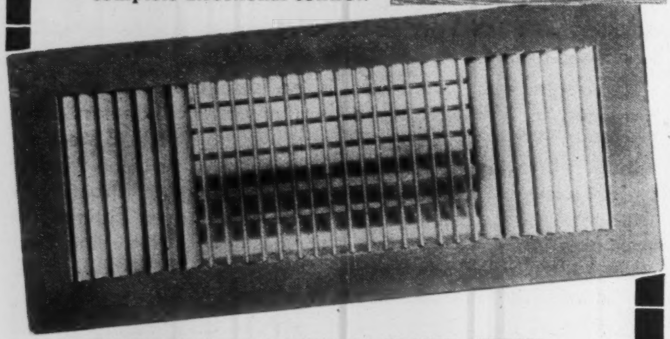
Airfoil

FEATURING

THE GREAT NEW *Airfoil* LOUVRE



At right is shown how the streamlined Titus Airfoil Louvre proves its superior control performance in the wind tunnel. The deep streamlined blade knifes the air like a wing of an airplane. Has little or no turbulence — absolute minimum noise — complete directional control.



★ **STREAMLINED "SMOOTH AS GLASS" AIRFOIL LOUVRE**
From the airfoil section of an airplane wing came the design for the Airfoil Louvre. No more perfect means of air control has been designed. That is why Airfoil grilles handle higher velocities of air with minimum *noise* and *turbulence* and a complete control—heretofore thought impossible.

★ **SOLID SECTION AIRFOIL LOUVRE CONSTRUCTION**
Made of extruded metal in one solid section. There are *no sharp corners — no holes — no crevices* down which the air may whistle. Extra depth of Louvre gives additional control.

★ **ONE PIECE FRAME**
Regardless of size, Titus Airfoil Grilles are constructed in one piece frame. Custom built for individual requirements. No mullions or butted construction.

★ **RUBBER GASKET**
The standard border of 1¼" is built on all Titus Airfoil Grilles. A rubber gasket seals grille tightly to wall. Prevents air leakage.

★ **TWO BANKS OF AIRFOIL LOUVRES**
Faster diffusion of air is gained with a positive 4-way control. Blades adjust individually.

★ **PREFERRED BY LEADING ARCHITECTS—BUILDERS—DESIGNERS**
Titus Airfoil Grilles are *years ahead—give more complete air control — faster diffusion — minimum noise.* These great features make Airfoil Grilles *first choice.* Write today for *Free 1949 Catalog.*

TITUS MANUFACTURING CORPORATION
WATERLOO, IOWA

stories and cartoons deal with the No. 422 power se stand, a portable unit designed to motorize hand pipe tools such as die stocks, pipe cutters, and reamers. A number of pages include photographs and descriptions of this unit, as well as three other portable threading machines.

Propeller Fans

No. 7098—Latest designs in self cooled, motor propeller fans are featured in a new catalog, No. 148, released by Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41. Three types of fans are covered, and available sizes and capacities are said to meet the requirements of virtually all exhaust fan applications. The numerous accessories also shown include standard and motor operated automatic shutters, penthouses, and guards. The booklet is concluded with data on filter type "Ilg-airators," and volume and utility centrifugal fans.

Protective Coatings

No. 7099—A new four page bulletin on "Ucilon" protective coatings introduces the latest developments in the line of corrosion resisting materials offered by United Chromium, Inc., 51 E. 42nd St., New York 17. In addition to recommended applications, the bulletin includes case histories.

Pump and Heater Sets

No. 7100—Peabody Engineering Corp., 580 Fifth Ave., New York 19, has released a four page bulletin on its line of duplex pump and heater sets. Including diagramatic layouts and illustrations of a wide range of these sets, the bulletin also gives information on the various elements and factors that must be considered in ordering a pump and heater set for any specified purpose.

Recorders and Controllers

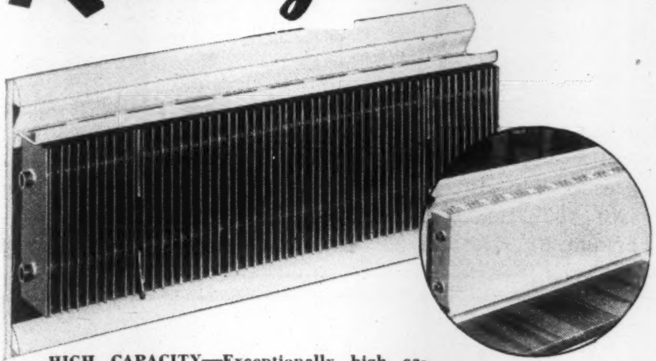
No. 7101—In Catalog ND44(1) Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, lists, for the first time in one publication, its complete line of strip chart "Micromax" recorders and controllers for measuring a wide variety of process variables including temperature, speed, gas analysis, electrolytic conductivity, pH, etc. Among the indicating recorders are single, two, and multiple point instruments designed to measure the values detected by one or as many as 16 primary elements. Among the recording controllers described are those which provide two-position control or are integral parts of a full proportional control system. Complete specifications are given in tabular form.

Refrigeration Compressor Unloader

No. 7102—Brunner Mfg. Co., 1821 E. Broad St., Utica 1, N. Y., has developed a capacity step control system for unloading cylinders of refrigeration compressors. Designed to overcome short cycling and said to be especially suitable for use in air conditioning systems, it is described and illustrated in an eight page bulletin.

Designed for Better Living . . .

Rittling BASEBOARD HEATING

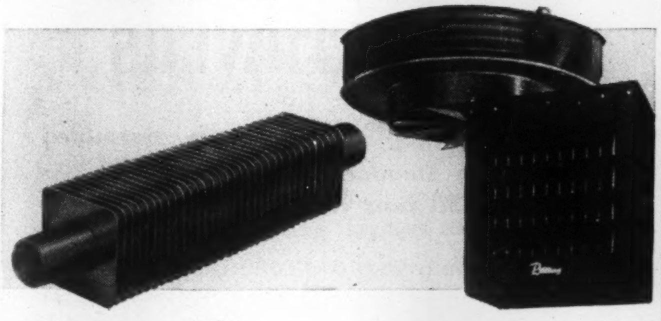


HIGH CAPACITY—Exceptionally high capacity per lineal foot (600 BTU with 170° water) permits operation most of the time on low water temperature; thus effecting fuel economy, draftless distribution and increased wall cleanliness.

SIMPLE INSTALLATION—(Does not have to be recessed.) Requires only a few wall brackets and fittings.

DURABLE CONSTRUCTION—Heavy wall copper tubing, aluminum radiating fins and heavy gauge sheet steel grilled covers.

Immediate Delivery *Write for Catalog B1*



MAGNA Fin
CONVECTORS
Write for Catalog MFC

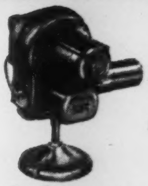
MAGNA Therm
UNIT HEATERS
Write for Catalog MTH

Manufacturers of Fin Tube Surfaces.
Inquiries Invited.

THE Rittling CORP.
1292 NIAGARA ST. BUFFALO 13, N. Y.

ALDRICH HEAT-PAK

OIL BURNERS



MODEL SAX

3 Models
5 Firing Ranges

Model SAX-1 (shown above) covers .75 to 1.35 gph, SAX-2 from 1.35 to 2 gph, and SAX-3 from 2 to 4.5 gph by interchange of draft tube assemblies. Model BX covers 4 to 8.50 gph and Model JU from 7 to 19 gph for larger installations.

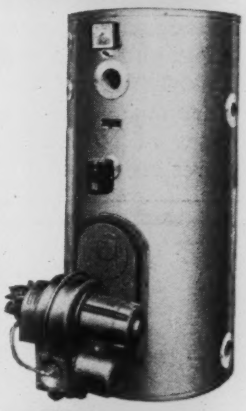
Featuring
ALDRICH-BUILT
Motors and Transformers

These efficient, well-built burners give reliable high performance. Made to serve all firing requirements from 3/4 to 19 gph. SAX models have interchangeable draft tube assemblies covering 3 ranges. Various length draft tubes are available, also either flange or pedestal mountings. Aldrich-built motors have continuous service-rating and transformers are radio interference-free. Burners are ideal for conversion, replacement, or original equipment.

ALDRICH HEAT-PAK

BOILER-BURNER UNITS

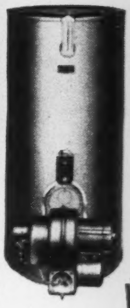
Featuring
BURNERS FOR OIL OR GAS
with Identical Ratings



These vertical fire-tube boilers are strongly built to highest standards of rugged welded construction. Give dependable, efficient performance on all types of steam or hot water heating systems. Six sizes cover capacities from 118,000 to 808,000 BTU per hour. Series B (shown) are oil-fired with Underwriters-approved Aldrich burners. Series BG are gas-fired with AGA-approved burners having ratings identical to corresponding oil burners. Both types of burners are on similar mounting plates for interchangeability. Efficient, high-delivery, double-spiral hot water coil available on specification. Many other outstanding features.

ALDRICH HEAT-PAK

HOT WATER SUPPLY UNITS



Featuring
FAST HEATING and LARGE DELIVERY
No Storage Tank Required

Ideal for use in residences, apartments, clubs, factories, and many commercial and industrial establishments. Same construction and features as Boiler-Burner units above, including interchangeable firing with either oil or gas. Capacities of six standard sizes range from 125 to 850 gph of water at 100 degrees rise. Complete set of automatic and safety controls furnished. Dress shell enameled beautiful Hammerloid blue with chrome trim rings. Many other features — see literature.

Write today for current literature giving complete specifications of all Aldrich products.

SOLD THROUGH JOBBERS

Aldrich products are distributed through established plumbing and heating jobbers, and are backed by an experienced sales and service organization. Investigate the value of handling the Aldrich line! Write us, so our nearest factory representative can call on you.

ONE OF THE BREEZE MARK PRODUCTS

ALDRICH COMPANY, 105 WILLIAMS ST., WYOMING, ILL.

A SUBSIDIARY OF THE BREEZE CORPORATIONS, INC.

Resistance Welding

No. 7103—The Vol. 14, No. 9 issue of the house organ published by Thomson Electric Welder Co., Lynn, Mass., features an article on how the company's model 124 motor driven spot welder is used in producing the wire grids used in the new "Self-Seal" air filter developed by Research Products Corp. Also included is a discussion of flash welding nonferrous metals, such as hard rolled copper, with the company's "Synchro-Matic" unit.

Rust Prevention

No. 7104—The Vol. 34, No. 10 issue of Lubrication, the house organ published by The Texas Co., 135 E. 42nd St., New York 17, features an article on rust prevention of equipment in storage and in use. In addition to describing the products available, such as oils, greases, and other compounds, preservation procedures with respect to engines, ball and roller bearings, turbines, hydraulic equipment, and tools are discussed and methods of testing rust preventive materials are enumerated

Safety and Relief Valves

No. 7105—Farris Engineering Corp., 494 Commercial Ave., Palisades Park, N. J., has issued a 72 page illustrated booklet giving data and information on its line of safety and relief valves. According to the company, this booklet, designated as Catalog 48, was originally intended as a catalog, but it is virtually a data book as 26 pages of technical information on safety and relief valves are included.

Salt As a Corrosion Problem

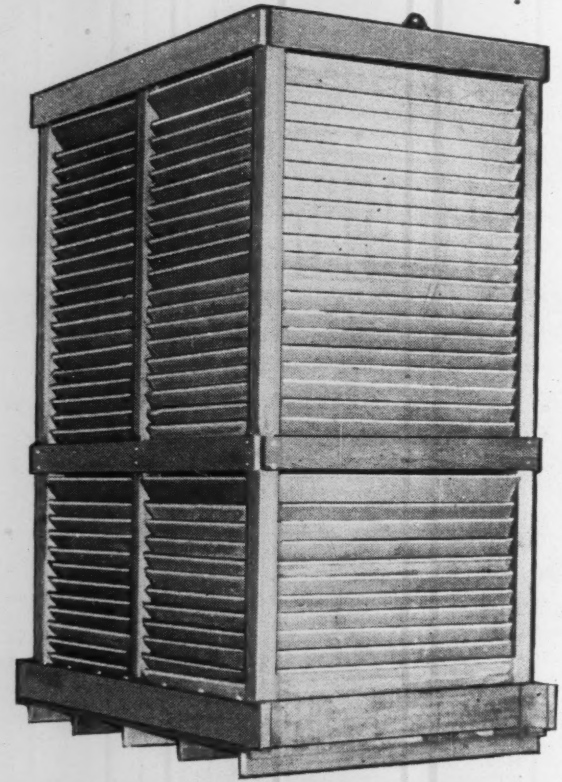
No. 7106—The part played by corrosion control in the production of salt and in the use of brine solutions by chemical and food processors is described in a new [illegible]0 page booklet on salt as a corrosion problem, published by International Nickel Co., Inc., 67 Wall St., New York 5. The contents of the booklet are about equally divided between a discussion of corrosion problems which are being solved by the salt industry, and equipment for handling the brine solutions in the chemical and process industries.

Self Locking Nut for Blind Assembly

No. 7107—Prestole Corp., 3150 Bellevue Rd., Toledo 6, has issued a specification sheet on its self locking nut for blind assembly. Attached directly from the assembly side, the "Snap Nut" is designed to accommodate both the Nos. 8 and 10 sheet metal screws. Arched spring arms of the nut expand to permit entry of the screw and at the same time bind against the root of the screw thread to provide a lock.

Separators for Air, Steam, Gas

No. 7108—A diversified line of separators designed to remove entrained moisture from live steam, oil and water from exhaust steam, and oil and water from compressed air and gas lines is covered in a new catalog (No. 500) issued by Wright-Austin Co., 315 W. Woodbridge St., Detroit 26. In addition to giving detailed



UNITED
REDWOOD "PACKAGE"
Atmospheric
COOLING TOWERS

Pre-fabricated *Easily Assembled*
Made in Standardized Sizes for
5 to 30 tons Refrigeration

Ideal for the commercial air conditioning and refrigeration job where requirements are known and efficient cooling equipment is desired at low standardized prices.

Towers ready for shipment. Larger towers of all kinds for commercial and industrial purposes.

Write for Bulletin 200-R giving full information on sizes, specifications, capacities, prices.

UNITED COOLING TOWER CO.
Porter Bldg. Linwood and Broadway Kansas City, Mo.

Sterlco

HEATING and TEMPERATURE CONTROL PRODUCTS

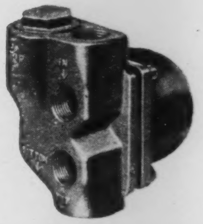
- dependable
- economical
- efficient

STERLCO HEATING SPECIALTIES

THERMOSTATIC TRAPS—sizes ½ in., ¾ in., 1 in., max. pressures 15, 65, 100, 125 psi; Angle, Straightway, Corner, Vertical Body Styles.

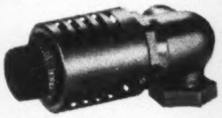
FLOAT and THERMOSTATIC TRAPS—sizes ¾ in. to 2 in.; max. pressures 15, 100 psi.

STRAINERS—max. pressure 125 psi.; Cast Iron Sizes ½ in. to 2 in.; Brass Sizes ⅜ in. to 1 in.



ILLUSTRATED—the compact, sturdy ¾ in. 69B F & T Trap which, like all other Sterlco traps, has a bellows type thermostat and replaceable seats and valve members.

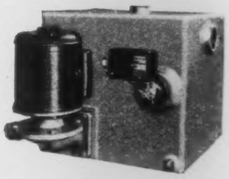
TEMPERATURE CONTROL VALVES



NO. 120 THERMOTROL (illustrated)—self-contained individual radiator temperature control for steam or hot water. Easily installed in place of manual radiator valve without wiring or other external connections.

TANK TEMPERATURE CONTROLS—self-powered modulating control valves for fluid heaters and process equipment. Sizes: ⅜ to 2 in.

STERLCO CONDENSATION and VACUUM PUMPS



NEW 4100 SERIES (illustrated)—neat, convenient unit with 15 gal. tank, dual voltage capacitor type motor, and carbon type rotary seal—for all jobs up to 12,000 sqft EDR, 20 psi.

3500 SERIES—heavy duty units with pedestal mounted steel tank for a wide range of jobs—2000 to 65,000 sqft, up to 150 psi.

3700 SERIES—heavy cast iron tank for installation underground or in wet locations. 2000 to 20,000 sqft, 20 or 30 psi.

VACUUM PUMPS—Type V, 2500 and 5000 sqft, 20 psi. Type S, 10,000 to 40,000 sqft, 20 to 40 psi.

Other STERLCO Products . . .
RADIATOR VALVES—Spring packed, ½ in. to 1 in.
3800 SERIES CONDENSATION PUMPS—for 30 lb. pressures, up to 10,000 sqft.
VACUUM FLOAT VENTS—QUICK VENTS—BOILER RETURN TRAPS.

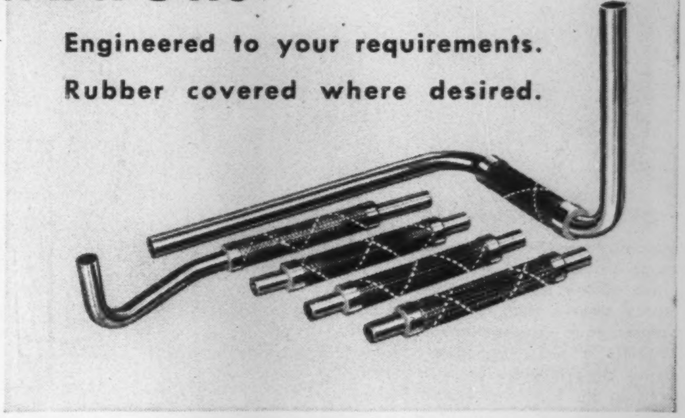
Distributed Through Leading Heating and Plumbing Wholesalers
Sales Representatives in Principal Cities

STERLING, INC.
3732 N. Holton St., Milwaukee 12, Wisconsin

YOUR BEST BUY IS BY Bendix AVIATION CORPORATION

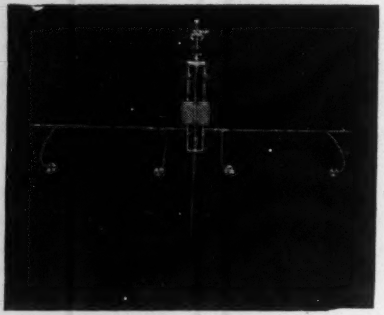
VIBRATION ELIMINATORS

Wherever you are faced with the problem of piping refrigerant gases and liquids under varying degrees of temperature and vibration, Bendix Seamless Flexible Metal Hose is the perfect answer. Deep parallel corrugations, uniform wall thickness and seamless construction assure greater flexibility—longer service life.


Engineered to your requirements.
Rubber covered where desired.

Made by Eclipse-Pioneer Division • Bendix Aviation Corporation • Teterboro, N. J.

NOW IT'S 4 STEPS



RID-AL SERVICE—(cleans chemically) steam and water systems. Removing sludge, scale and rust safely and economically.

AKWATROL—You get *conjunctive* scale control, *automatically*.

DELTA PROCESS—Catalytically prevents smoke and eliminates nuisance fly ash and fire scale.

TANK LINING—New life to old tanks—completely renewed by our scientific elastic porcelain tank lining.

Associated companies render a national service. Your territory may be available.

Write today for further information and literature.

APEX Engineering Company
75 E. Wacker Drive, Chicago 1, Ill.

SPRAY NOZZLES for INDUSTRY
GENERAL CATALOG NO. 22
PNEUMATIC ATOMIZING NOZZLE CATALOG NO. 23

get all the facts

Unless you have these two great catalogs on hand, you are missing two of the most complete sources of spray nozzle data ever produced. Whatever your requirements, you will be taking a big step toward lower spraying costs and better performance by writing for Spraying Systems Spray Nozzle Catalogs No. 22 and 23. Why not write right now?

SPRAYING SYSTEMS CO.
Engineers and Manufacturers
3219 RANDOLPH STREET • BELLWOOD, ILLINOIS (Suburb of Chicago)

information on the separators, the booklet covers recommended traps and cyclone type exhaust heads and mufflers. Capacity charts and pressure tables are included.

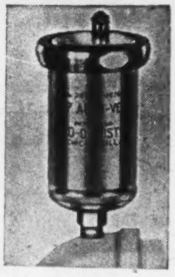
Silicone Fluids

No. 7109—Silicone Note Book (fluid series No. 3), prepared by Dow Corning Corp., Midland, Mich., is said to contain the most comprehensive body of information available on the properties and behavior of the company's DC 200 silicone fluids. These semi-inorganic fluids are said to be notable for their heat stability, shear resistance, relatively constant viscosity over a wide temperature range, lubricity, water repellency, and good dielectric properties. The booklet also covers such applications as damping and hydraulic media, liquid dielectrics, special purpose lubricants, additives, impregnants, and coatings.

Silver Brazing Alloys

No. 7110—Instructions for brazing fittings to pipe and tubing with "Easy-Flo" and "Sil-Fos" low temperature silver alloys are contained in a new bulletin (No. 17) issued by Handy & Harman, 82 Fulton St., New York 7. The instructions given cover various steps for preparation such as cutting, fitting, cleaning, fluxing, and supporting the assembly, as well as heating and flowing the alloy and cleaning after brazing.

STEP UP your circulation with AUTO-VENT Air Eliminators



Simple as A-B-C . . yet positive in action every time! Sure-cure for air pockets and air traps that hold up the free circulation of water or other liquids flowing through pipes —pressures to 75 lbs. Simple in construction—easy to install!

Built of brass with self-closing float operated valve. Withstands high temperatures, oil and other adverse conditions. **Try these No. 7 Auto-Vents once, and you'll use them on every job. They're that good, yet NOT expensive!** Write us today, or see your jobber.

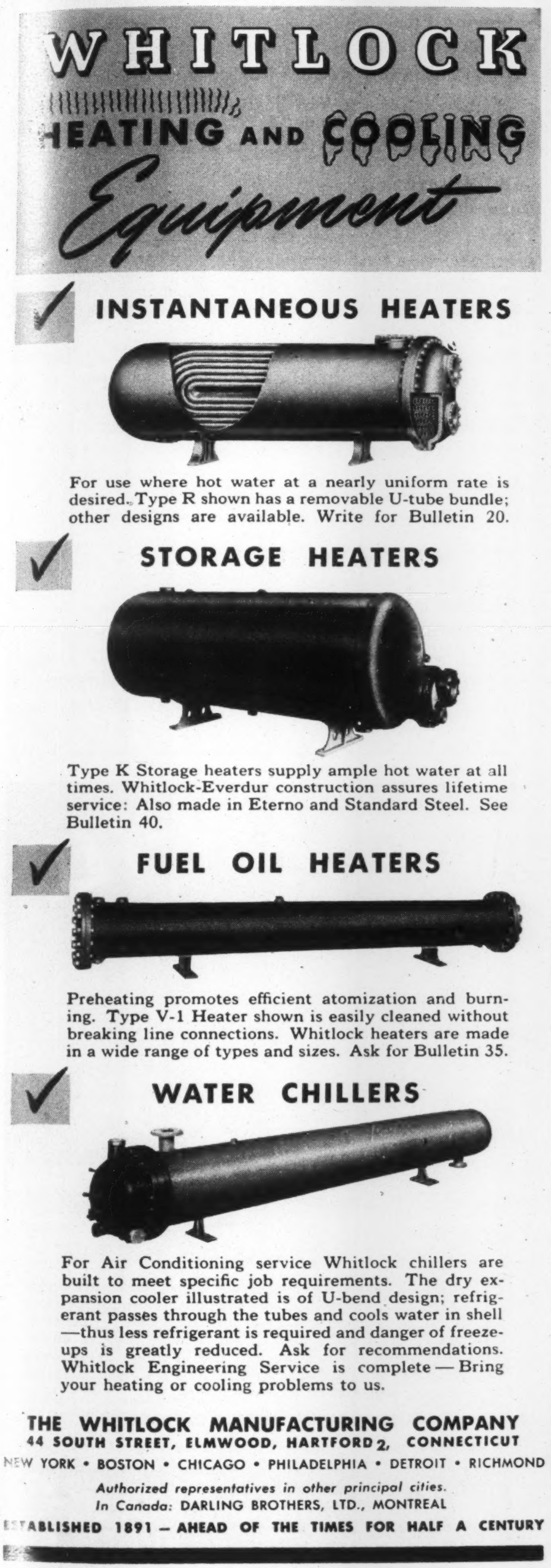
★ ★ ★

See Our Exhibit
9th Heating & Ventilating Exposition at International Amphitheatre, Chicago—January 24 to 28—Booth 1015

HERE'S HOW TO VENT!
- Hot Water Heating Lines
- Hot Water—Convectors Unit Heaters Baseboards
- Cold Water Lines
- Coils, Tanks, Etc.

MAID-O'-MIST INC.
3215 N. PULASKI RD.
CHICAGO 41, ILLINOIS

AUTOMATIC HUMIDIFIERS FOR ALL TYPES OF HEATING SYSTEMS



WHITLOCK
HEATING AND COOLING
Equipment

✓ **INSTANTANEOUS HEATERS**

For use where hot water at a nearly uniform rate is desired. Type R shown has a removable U-tube bundle; other designs are available. Write for Bulletin 20.

✓ **STORAGE HEATERS**

Type K Storage heaters supply ample hot water at all times. Whitlock-Everdur construction assures lifetime service: Also made in Eterno and Standard Steel. See Bulletin 40.

✓ **FUEL OIL HEATERS**

Preheating promotes efficient atomization and burning. Type V-1 Heater shown is easily cleaned without breaking line connections. Whitlock heaters are made in a wide range of types and sizes. Ask for Bulletin 35.

✓ **WATER CHILLERS**

For Air Conditioning service Whitlock chillers are built to meet specific job requirements. The dry expansion cooler illustrated is of U-bend design; refrigerant passes through the tubes and cools water in shell —thus less refrigerant is required and danger of freeze-ups is greatly reduced. Ask for recommendations. Whitlock Engineering Service is complete — Bring your heating or cooling problems to us.

THE WHITLOCK MANUFACTURING COMPANY
44 SOUTH STREET, ELMWOOD, HARTFORD 2, CONNECTICUT
NEW YORK • BOSTON • CHICAGO • PHILADELPHIA • DETROIT • RICHMOND
Authorized representatives in other principal cities.
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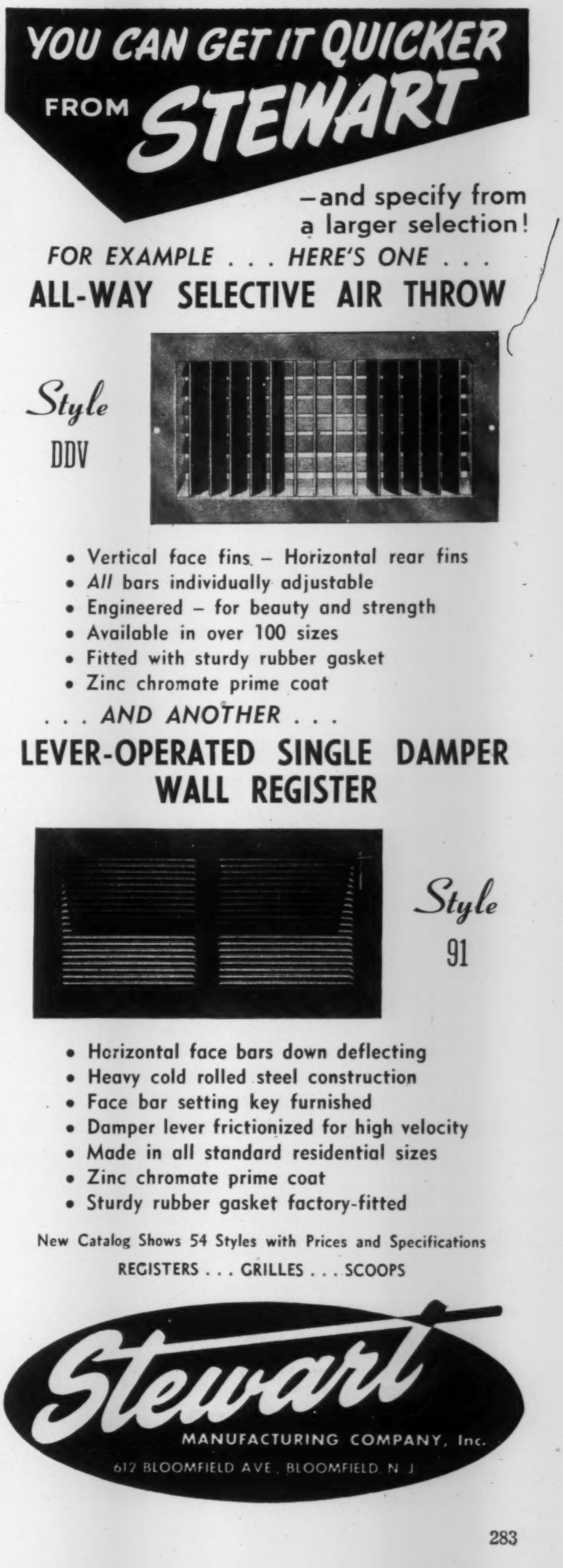
ESTABLISHED 1891 – AHEAD OF THE TIMES FOR HALF A CENTURY



YOU CAN GET IT QUICKER
FROM STEWART

–and specify from
a larger selection!

FOR EXAMPLE . . . HERE'S ONE . . .

ALL-WAY SELECTIVE AIR THROW

Style DDV

- Vertical face fins – Horizontal rear fins
- *All* bars individually adjustable
- Engineered – for beauty and strength
- Available in over 100 sizes
- Fitted with sturdy rubber gasket
- Zinc chromate prime coat

. . . AND ANOTHER . . .

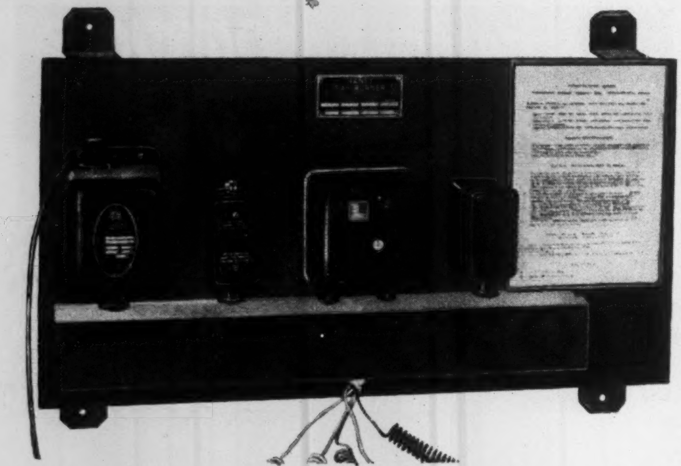
LEVER-OPERATED SINGLE DAMPER WALL REGISTER

Style 91

- Horizontal face bars down deflecting
- Heavy cold rolled steel construction
- Face bar setting key furnished
- Damper lever frictionized for high velocity
- Made in all standard residential sizes
- Zinc chromate prime coat
- Sturdy rubber gasket factory-fitted

New Catalog Shows 54 Styles with Prices and Specifications
REGISTERS . . . GRILLES . . . SCOOPS

Stewart
MANUFACTURING COMPANY, Inc.
612 BLOOMFIELD AVE., BLOOMFIELD, N. J.

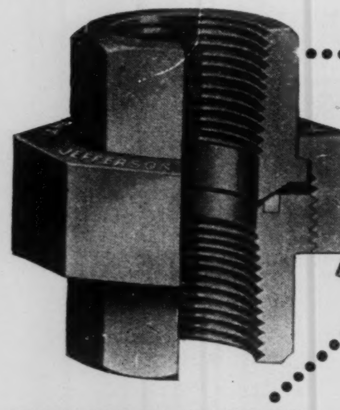


HANEY ELECTRONIC FLAME FAILURE SAFETY CONTROL PANEL

The Haney Electronic flame failure safety control panel, ready for installation, provides safe, sure and positive combustion control and will meet insurance requirements. It is so designed that the burner cannot operate unless a pilot flame of sufficient size to ignite the burner is present and the unit itself is functioning.

Complete, descriptive literature is available and is yours for the asking. Write today.

HANEY GAS BURNER AND ENGINEERS
909 South Myrtle Avenue Monrovia, California

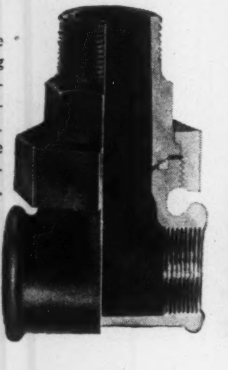


....here's how to

Save Space in Tight Spots

JEFFERSON SPECIALTY UNIONS

Sooner or later you'll run into piping installations which cause trouble because of limited clearance. You can quickly overcome problems of this sort by installing Jefferson Specialty Unions. They're easy to work with . . . save time, labor and space . . . may be broken time and again without affecting their tightly sealing qualities. Lasting joints are assured by the exclusive recessed brass seat which cannot be dislodged by pipe ends screwed in too far. Leakproof joints and no maintenance problems are yours when you use Jefferson Specialty Unions. Investigate today—we'll gladly send more information.



JEFFERSON UNION CO.

607 West 26th Street, New York 1, N. Y.
35 Fletcher Avenue, Lexington 73, Mass.
65 Gooding Street, Lockport, N. Y.

Soldering Flux in Stick Form

No. 7111—"Amco" No. 323 fluxing stick is said to be 100 percent active soldering flux in stick form. It is available from American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, and is described in a new folder.

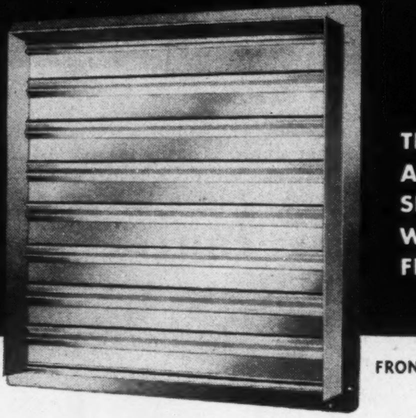
Solid Adsorption Dehumidifier Performance

No. 7112—As consultants to Pittsburgh Lectrodryer Corp., P.O. Box 1766, Pittsburgh 30, E. R. Queer, professor of engineering research, and E. R. McLaughlin, associate professor of engineering research, Pennsylvania State College, have prepared a report on the performance of a solid adsorption dehumidifier. Identified as Bulletin 214 and available from the company, the report covers the work done to establish a method of testing dehumidification equipment for the U. S. Navy. Also reported for the first time is a novel method of plotting the performance of the solid adsorption type dehumidifier on a psychrometric chart. Another chart shows the phenomena occurring with respect to relative humidity in sealed containers at various temperatures.

Steam and Hot Water Unit Heaters

No. 7113—Series 15 unit heaters are described and illustrated in a 16 page catalog (No. 15C-4) released by Fedders-Quigan Corp., Buffalo 7. In addition to covering design and construction features of these units which incorporate streamlined copper tubes with metal-

they all want AIR-FLO



MODEL A-555

THE AUTOMATIC SHUTTER WITH ALL THE FEATURES

FRONT VIEW—CLOSED

IT TAKES THE LOAD OFF THE FAN!

Aluminum louvers open fully, permitting capacity fan operation. New heavy reinforcement strip adds strength and long life to the louvers, assures quiet operation and perfect counterbalance, prevents rattling. Deep shroud protects shutter from high winds. Tie-rod, brackets and bearings inside frame, not exposed to weather. Special finish resists corrosion. Many other features.

WRITE FOR NEW AIR-FLO CATALOG 43-D

Illustrations and details of the complete Air-Flo line.

AIR CONDITIONING PRODUCTS CO.
2340 W. LAFAYETTE BLVD. • DETROIT 16, MICH.

ROTH HEAVY DUTY BOILER FEED UNITS

GUARANTEED PERFORMANCE

Boiler H.P.—1 to 350
Boiler Pressures—20 to 150#
G.P.M.—2 to 50
Tank Sizes—20 to 350

A complete line for a wide range of applications.

Compact Design— • available in "package" or "knock down" units • easily installed

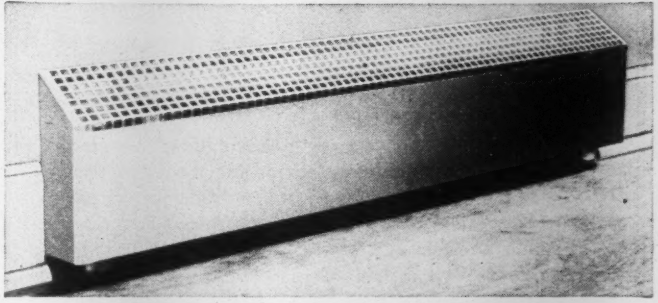
Write for Bulletin 200

ROY E. ROTH COMPANY
2484 4th Ave.
ROCK ISLAND, ILLINOIS

MORE FEATURES TO SELL!

- Prompt Delivery

REMPE
AIR GUIDE
CONVECTORS
Wall panel type



HEAT TRANSFER EQUIPMENT REMPE CO. Founded 1890

FOR INSTALLATION ABOVE OR IN BASEBOARD
FOR STEAM OR HOT WATER

An attractive, easy to install Fin Tube Convector for new installations or replacement of cast iron radiators. Strong slanted steel cover.

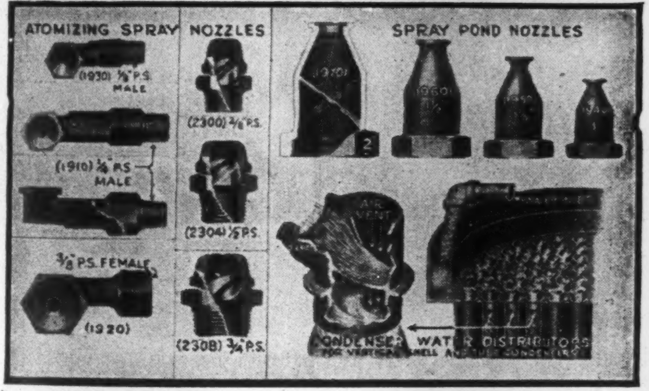
Rempe method of using 3/16" collar into which tubes are expanded provides more efficient heat transfer—greater B.T.U. capacity per lineal foot. E.D.R. capacity 4.75 sq. ft. per lineal foot of casing length. 8" high x 3" deep. Lengths up to 116".

Write today for prices—Territories open.

REMPE CO.
342 N. SACRAMENTO BLVD. CHICAGO 12, ILLINOIS

QUALITY always wins!

MARTOCELLO Products are fully DEPENDABLE



ATOMIZING SPRAY NOZZLES, SPRAY POND NOZZLES, and CONDENSER WATER DISTRIBUTORS

For Vertical Shell and Tube Ammonia Condensers

ALL MARTOCELLO SPRAY NOZZLES are manufactured with precision and of a design which has been thoroughly tested for maximum results and durability. They are guaranteed to give satisfaction. Successful efficient results depend largely upon selecting the proper number, type and size of Nozzles suitable for your installation.

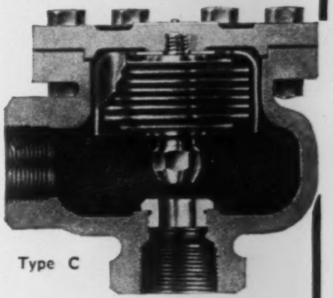
THE MARTOCELLO CONDENSER WATER DISTRIBUTORS are now used as standard equipment by Progressive Refrigerating Engineers in solving their Manpower problem, because they require no attention and assure users of the lowest Condenser Operating Pressures and Minimum Power Cost. It will pay you to consult us. WRITE or WIRE for further information.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA

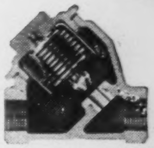
"Serving the Ice Industry Since 1916" "There is no Substitute for MARTOCELLO QUALITY"

DOES DIRT plug your steam TRAPS?

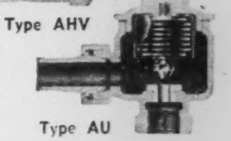
Larger, At-Bottom Valve Keeps Nicholson Traps Clean



Type C



Type AHV



Type AU

Valve orifices of Nicholson steam traps are 2 to 6 times larger than in average traps, minimizing chances of plugging. And, valves being at the bottom, dirt drops out by gravity. This ability to self-clean is one of the features resulting in the unequalled discharge capacity of Nicholson traps. 5 types for every purpose; size 1/4" to 2"; pressures to 225 lbs. Test trap gladly sent.

BULLETIN 1047
Or see Sweet's

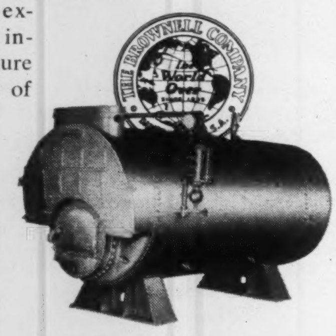
W. H. NICHOLSON & CO. 198 OREGON STREET WILKES-BARRE, PA.

Traps ★ Control Valves ★ Steam Specialties

"SCOTCH"
AN APT NAME FOR THESE
BROWNELL BOILERS

Brownell Scotch Boilers are thrifty . . . economical to install and operate. They do not require casings, but can be easily covered with insulation. Low construction is an advantage where head room is limited. Can be used for power, processing, heating. Adaptable for oil, gas, or coal firing. Made in 12 sizes, ranging from 10 to 180 hp, 1,400 to 25,500 sq. ft. steam radiation. New bulletin just printed.

The Brownell line also includes small-capacity steel heating boilers, Standard electric-welded steel boilers, H. R. T. boilers, double-pass boilers, locomotive type boilers, vertical tubular boilers, wormfeed and ramfeed stokers, heat exchangers. You are invited to ask for literature on any or all types of Brownell equipment.



THE
BROWNELL
COMPANY
408 N. FINDLAY ST.
DAYTON 1, OHIO

lically bonded fins, the booklet includes data on capacities for both hot water and steam applications, dimensions, and wiring and piping diagrams. Also included is information on air throw distance and the selection of heater location.

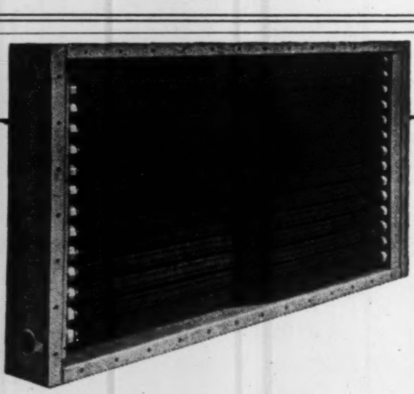
Steam Generators

No. 7114—Design and construction features, together with typical performance data, are featured in a new bulletin (No. B-3250A) on the steam generators made by Titusville Iron Works Co., Div. of Struthers Wells, Titusville, Pa. The boilers, designed for use with oil, gas, or coal, incorporate water wall tubes, baffles designed to provide four passes of gas travel, and steel encased refractory and insulation. A number of 150 and 200 hp, 160 psi generators are illustrated.

Technical Data on Aluminum Insulation

No. 7115—Aluminum insulation of the "accordion" type, which is available for installation on 16 and 24 in. centers and which has two rows of alternating reverse triangular air spaces, is thoroughly covered in a new 32 page data book released by Infra Insulation, Inc., 10 Murray St., New York 7. Entitled Simplified Physics of Thermal Insulation, the book is a completely revised and expanded edition of an earlier work. It presents a discussion of heat transfer, condensation, mold, vermin, radiant heating, and other factors related to insulation. Reports and discussions by various laboratories and

G&O
RADIATION



G&O COILS
FOR HEATING AND COOLING
IN
A WIDE RANGE OF SIZES

Send for Catalog

THE G & O MANUFACTURING COMPANY
New Haven, Connecticut
Pioneer Manufacturers of Square Finned Tubing in the United States

VENTILATING FANS

GB fans ● manufactured for industrial ventilating and heating ● fume extraction ● forced draft ● induced draft ● Air-conditioning ● drying and processing, are of forward or backward curved wheel design.

Type F.C. are designed for quiet operation at low speeds. Type B.C. are designed to operate at high speeds and have the non-overloading characteristics.

Capacities of 200 c.f.m. to 300,000 c.f.m. are covered by standard sizes and arrangements.

The heavier constructions of classes II, III and IV cover the particular needs of special applications.

Send for Bulletin SC-103.

GB
"LUNGS FOR INDUSTRY"
GENERAL BLOWER CO.
8610 Ferris Ave. Morton Grove 16, Ill.
Engineering Offices In All Principal Cities

Finer Performance with Oil or Gas

ASME CONSTRUCTION

EXCLUSIVE SPIRAL TUBES

Mt Hawley
BOILER-BURNER UNITS

104,000 to 1,043,000 BTU Boiler-burner units, gas or oil-fired. Exclusive Spiral Tube design extracts more heat, reduces stack temperature by 100°. 7 sizes—3 domestic; 4 commercial. Shipped assembled, just remove crate. Easy to install. All sizes available galvanized for water heating. Write for literature.

MT. HAWLEY MFG. COMPANY
1, Mt. Hawley Airport, Peoria, Illinois
Manufacturers of a complete line of conversion oil burners—0.65 to 20 G.P.H.

SEE—
for yourself
How a fast-running repair job is done in an old hotel

You can do more work every day when you bend pipe with a

TAL
Portable
Bender

Work goes faster when you bend on the job — either original installation, radiant heat or repair. Fewer joints to leak in the future, less friction, more satisfaction for your customers and a bigger profit for you. Do as hundreds everywhere are already doing. Write for illustrated data bulletin. Dept. 13

Tal Bender, Inc. Milwaukee 2, Wisconsin

NOW—★ PREVENT-REMOVE SCALE and CORROSION

Guaranteed with

BECO CELL
Patented

What the industry has needed for years — A good, practical, economical protection THAT WORKS!

- **Worry Free Application**—scientific electrolytic process functions according to amount of foreign substances in solutions.
- **Eliminates Guess Work** of internal treatment . . . provides dependable protection.
- **Replaceable Wearing Element**
- **Easily Installed Right on the Job**
- **No Further Attention Necessary** than to blow down regularly and wash down occasionally.
- **On the Job Since 1940**
Write for information concerning your problem — inquiries invited from manufacturers' representatives, dealers and jobbers.
- No Wiring
- No Chemicals

★ for —
- Boilers, Gas Engine and Diesel Circulating Systems
- Large Hot Water Systems
- Automobiles and Trucks
- Oil Industry

BROWN ELECTRO COMPANY
17 North Dewey • Oklahoma City 2

THE
NEW
UNIVERSAL
TYPE "N"
BLOWER

MASSACHUSETTS . .

By changing the position of the oil cup, the four popular discharges (lower horizontal, upper horizontal, down-blast and up-blast) can be obtained. Sizes 7 to 16½ inches wheel diameter.

WRITE FOR BULLETIN No. 110 CATALOG

MASSACHUSETTS BLOWER DIVISION
The **BISHOP & BABCOCK** *Mfg. Co.*
4901 HAMILTON AVENUE CLEVELAND 14, OHIO

LEAKS COST MONEY
KEY
GRAPHITE PASTE

Protect Your Oil or Steam Lines Against Leaky Joints with KEY GRAPHITE PASTE

Thread and gasket connections on oil lines... either hot or cold... or high pressure steam lines... will not leak when sealed with Key Graphite Paste.

This sealing compound expands when it is heated, forming a perfect seal. Assembled joints will not freeze in service. Key preserves threads and gaskets and, above all, it is economical to use because it goes several times further than ordinary pipe dopes.

Ask your jobber for Key Graphite Paste or take advantage of our FREE sample offer.

SEND FOR FREE SAMPLE
Try Key Graphite Paste at our expense

KEY COMPANY
2617 McCasland Ave., E. St. Louis, Ill.

KEY Company

authorities are cited. A chart giving data on a num er of insulating materials shows *k, C, R,* and *U* ther al factors.

Tungsten Electrodes

No. 7116—Tungsten electrodes for inert gas and at ic hydrogen welding are the subject of a four page bull in (1.102) issued by Fansteel Metallurgical Corp., N th Chicago, Ill. Photos are used to illustrate welds w h may be made by inert welding with the company's e trodes. Dimensions, list prices, and other data are t ulated.

Vibration Control

No. 7117—The advantages and limitations of sp ng mountings, rubber mountings, and cork materials in he control of vibration, together with data on their n stallation and uses, are given in a new bulletin, G- 01, issued by Korfund Co. Inc., 48-01-F, Thirty-Second Pl., Long Island City 1, N. Y. A selector chart tabulates more than 50 typical machine and equipment applications and gives recommendations for control of vibration.

Water Demineralizer

No. 7118—A folder released by Penfield Mfg. Co., Inc., 19 High School Ave., Meriden, Conn., describes a recently marketed, low cost cartridge type water demineralizer. Designed to convert tap water into mineral-free water, the self contained unit incorporates cartridges packed

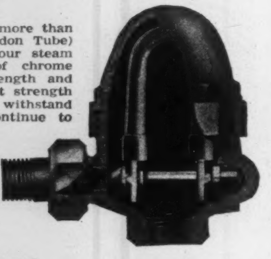
HAINES TRAPS

HAVE PROVEN THEIR

Merit Simplicity Durability

HAINES TRAPS have been manufactured for more than fifty years in which the Thermostat (or Bourdon Tube) has been perfected and is as accurate as your steam gauge. The operating member is made of chrome molybdenum steel tubing which assures strength and endurance. Haines Traps, due to the inherent strength of their design and construction, are able to withstand the stress of excess pressures and still continue to function. In Haines Traps, the thermostat is subjected to the lower temperature of the return line. This permits of greater valve travel and a more positive draining of the unit to which the trap is attached. The thermostatic member is mounted vertically on a horizontal valve motion and closes the valve piece against the flow of steam. The end of the thermostatic member opposite the valve is anchored, hence the travel of the thermostat either opens or closes the valve. Due to the fact that the Thermostat is mounted outboard the valve piece, the Haines Trap controls a large valve opening, which enables it to handle large volumes of air and water and prevents it from becoming ineffective from scale or other foreign matters.

Haines Float & Thermostatic Traps are built for any low pressure installation up to 15 lbs. in the ¾" and 1¼" sizes and 30 lbs. in the 1" size. They cannot become air bound and the Haines underslung principle insures safety . . . no danger of building up a pressure.

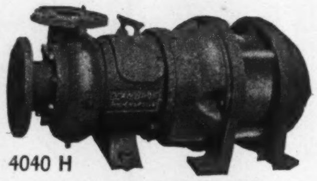

Vento Radiator Trap

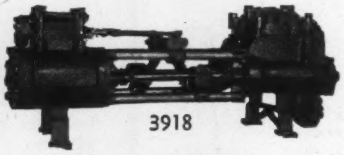
F & T Trap

WM. S. HAINES & CO.
1012 Wood Street
Philadelphia 7, Penna.

PUMPS CENTRIFUGAL RECIPROCATING

INDEANAPOL'S
INDEANA


4040 H
Close Coupled Centrifugal Pump


3918
Durable Duplex, Packed Piston Pattern Steam Pump

Centrifugal Pumps Turbine and Motor Drive Pumps for Handling Most Any Liquids and Service Steam and Power Driven

ESTABLISHED 1869
DEAN BROTHERS PUMPS INC.
INDIANAPOLIS IND.
323 W. Tenth St.

SECTION OF JANUARY 1949 HEATING, PIPING & AIR CONDITIONING

1949 DIRECTORY

of

HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT

for

INDUSTRIAL, COMMERCIAL, INSTITUTIONAL AND PUBLIC BUILDINGS

PART 1—PRODUCTS CLASSIFIED—PAGE 295

If you want to know the names of one or more manufacturers making a certain product, look in Part 1, where products are classified alphabetically in "directory style" with the noun governing (for instance, "unit heaters" are listed under "heaters, unit").

PART 2—TRADE NAMES—Page 381

If you have the trade name of a product and want to know who manufactures it, look in Part 2, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be easily identified under their product classification in Part 1.

PART 3—MANUFACTURERS' ADDRESSES—PAGE 395

For the complete name and address of any manufacturer look in Part 3.

● The manufacturers whose names are spotted throughout the listings advertise in this issue. See Index to Advertisers (on pages 411-412) for the page on which you will find the advertising of any of these manufacturers.

**Heating, Piping & Air Conditioning
6 N. Michigan Ave.
Chicago 2, Illinois**

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and is copyrighted, 1949, by the Keeney Publishing Co.,
6 N. Michigan Ave.,
Chicago 2, Ill.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 1—PRODUCTS CLASSIFIED

ABSORBERS, VIBRATION

See Hose, Metal and Fittings; Bases and Pads, Vibration Isolating

ABSORBERS, VIBRATION FOR REFRIGERANT LINES

American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
• Bendix Aviation Corp., Eclipse—Pioneer Div., Metal Hose Dept., Teterboro, N. J.
• Chicago Metal Hose Corp., Maywood, Ill.
Firestone Industrial Products, Akron, O.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Wade Mfg. Co., Elgin, Ill.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

• Acme Industries, Inc., Jackson, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
• Frick Co., Waynesboro, Pa.
• McQuay, Inc., Minneapolis, Minn.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Phillips & Co., H. A., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.

ADHESIVES, FOR PIPE COVERING

Arabol Mfg. Co., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Cork Import Corp., Englewood, N. J.
Firestone Industrial Products, Akron, O.
Flintkote Co., The, New York, N. Y.
Miracle Adhesives Corp., New York, N. Y.
Moore Co., Goodloe E., Danville, Ill.
Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
Pecora Paint Co., Inc., Philadelphia, Pa.
St. Clair Rubber Co., Detroit, Mich.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
• Stic-Klip Mfg. Co., Cambridge, Mass.

ADSORBERS, ODOR

Betz Corp., Hammond, Ind.
Carbide and Carbon Chemicals Corp., New York, N. Y.
• Connor Engineering Corp., W. B., New York, N. Y.
Refinite Corp., Omaha, Neb.
Tamms Silica Co., Chicago, Ill.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
American Moistening Co., Providence, R. I.
Andale Co., Philadelphia, Pa.
• Bethlehem Steel Co., Bethlehem, Pa.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Goodyer Industries, Inc., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
• Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
• Joy Mfg. Co., Pittsburgh, Pa.
• Modine Mfg. Co., Racine, Wis.
• Murray Mfg. Co., D. J., Wausau, Wis.
Parks-Cramer Co., Fitchburg, Mass.
• Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schramm, Inc., West Chester, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Wilson Engineering Corp., Chicago, Ill.
• Worthington Pump & Machinery Corp., Harrison, N. J.
• Young Radiator Co., Racine, Wis.

AIR AFTERCOOLERS

See Aftercoolers, Compressed Air

AIR BREAK FITTINGS

See Fittings, Drainage, Fixed Air Break

AIR CLEANERS

See Cleaners, Air, Electrical

AIR COMPRESSORS

See Compressors, Air

AIR CONDITIONERS

See Units, Air Conditioning

AIR CONDITIONING UNITS

See Units, Air Conditioning

AIR DIFFUSERS

See Diffusers, Air, High Velocity; Grilles; Panels, Perforated, for Air Diffusion; Registers

AIR ELIMINATORS

See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS

See Compounds, Cleaning, Air Filter

AIR FILTER GAGES

See Gages, Air Filter

AIR FILTERS

See Filters, Air

AIR FRESHENING

See Compounds, Air Freshening; Adsorbers, Odor

AIR OPERATING VALVES

See Valves, Air Operating

AIR PURIFICATION

See Adsorbers, Odor

AIR RECOVERY EQUIPMENT

See Adsorbers, Odor

• Advertisement in this issue. See Index to Advertisers, pages 411-412

AIR SEPARATORS

See Separators, Air

AIR VALVES

See Valves, Radiator, Air

AIR VELOCITY METERS

See Meters, Air Velocity, Direct Reading; Anemometers

AIR VOLUME METERS

See Meters, Volume, Air and Gas

AIR WASHERS

See Washers, Air

ALARMS, HIGH AND LOW BOILER WATER

American District Telegraph Co., New York, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Campbell Co., J. A., Long Beach, Calif.
● Combustion Control Corp., Cambridge, Mass.
Defender Instrument & Regulator Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, LIQUID LEVEL, AUDIBLE

American District Telegraph Co., New York, N. Y.
B/W Controller Corp., Birmingham, Mich.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Reliance Gauge Column Co., Cleveland, O.
Scully Signal Co., Cambridge, Mass.
Uehling Instrument Co., Paterson, N. J.

ALARMS, SMOKE

American District Telegraph Co., New York, N. Y.
● Autempco Corp., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Boiler Room Equipment Inc., New York, N. Y.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Defender Instrument & Regulator Co., St. Louis, Mo.
Ess Instrument Co., Bergenfield, N. J.
Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.
General Power Plant Corp., New York, N. Y.
Instrument Engineering Associates, Brooklyn, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Photoswitch, Inc., Cambridge, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.
Worner Electronic Devices, Rankin, Ill.

ALGAE CONTROL, WATER TREATMENT FOR SLIME AND

See Treatment, Water, for Slime and Algae Control

ALUMINUM COATED SHEETS

See Sheets, Aluminum Coated

ALUMINUM PIPE

See Pipe, Aluminum

ALUMINUM SHEETS

See Sheets, Aluminum

ANALYZERS, CARBON DIOXIDE, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co. F., W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Service to Industry, West Hartford, Conn.
Uehling Instrument Co., Paterson, N. J.
Weaver Mfg. Co., Springfield, Ill.

ANEMOMETERS

Barclay, Inc., Robert, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon, Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Willson Products, Inc., Reading, Pa. (Thermometer type)

ANGLE VALVES

See Valves, Angle

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Atlantic Steel Co., Atlanta, Ga.
● Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
● Carnegie-Illinois Steel Corp., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
● Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.
Decatur Iron & Steel Co., Decatur, Ala.
Dow Chemical Co., The, Midland, Mich.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Lees, John, Div., The, Serrick Corp., Muncie, Ind.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Republic Steel Corp., Cleveland, O.
● Revere Copper and Brass, Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
● Weirton Steel Co., Weirton, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

AQUASTATS

See Thermostats

ARC WELDERS

See Welders, Arc

ARC WELDING ELECTRODES

See Electrodes, Arc Welding

ASBESTOS FIBER AND CEMENT PIPE

See Pipe, Asbestos Fiber and Cement

ASBESTOS PACKING

See Packing, Asbestos

ASH CONVEYORS

See Conveyors, Coal and Ash

ATOMIZING NOZZLES

See Nozzles, Atomizing

AXIAL FLOW FANS

See Fans, Axial Flow, Pressure Type

BALANCING ELBOWS FOR HOT WATER HEATING SYSTEMS

See Elbows, Balancing, for Hot Water Heating Systems

BALANCING EQUIPMENT

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BALANCING VALVES

See Valves, Balancing

BALL BEARINGS

See Bearings, Ball

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BAROMETRIC CONTROLS

See Controls, Draft, Barometric

BASEBOARD RADIATION

See Radiation, Baseboard

BASES, MOTOR, TENSION ADJUSTING

Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Electrovent Fan & Mfg. Co., Chicago, Ill.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Rhoads & Sons, J. E., Philadelphia, Ind.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Schnacke, Inc., Evansville, Ind.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

BASES AND PADS, VIBRATION ISOLATING

● Buffalo Forge Co., Buffalo, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Cork Import Corp., Englewood, N. J.
Cork Insulation Co., Inc., New York, N. Y.
Felters Company, The, Boston, Mass.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hobsite Products Co., Paterson, N. J.
Johns-Manville, New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
Lord Mfg. Co., Erie, Pa.
M B Mfg. Co., Inc., The, New Haven, Conn.
● Mundet Cork Corp., North Bergen, N. J.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J.
Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Sponge Rubber Products Co., Shelton, Conn.
United Cork Companies, Lyndhurst, N. J.
United States Rubber Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Western Felt Works, Chicago, Ill.

BEARINGS, BALL

Ahlberg Bearing Co., Chicago, Ill.
Bearings Co. of America, Lancaster, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
Landis & Gyr Inc., New York, N. Y.
Link-Belt Co., Indianapolis, Ind.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Thomson Industries, Inc., Manhasset, N. Y.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE

Roller Bearings Co. of America, Trenton, N. J.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.

BEARINGS, PILLOW BLOCK

Ahlberg Bearing Co., Chicago, Ill.
Anti-Friction Bearings Co., Los Angeles, Calif.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Dick Co., Inc., R. & J., Passaic, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Freed Products Co., Moline, Ill.
Goldens' Foundry & Machine Co., Columbus, Ga.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lau Blower Co., Dayton, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Norma-Hoffman Bearings Corp., Stamford, Conn.
● Randall Graphite Bearings, Inc., Chicago, Ill.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Downers Grove, Ill. (self aligning)
Sprout, Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Triangle Mfg. Co., Oshkosh, Wis.
Webb Co., The, Webb City, Mo.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

Ahlberg Bearing Co., Chicago, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Downers Grove, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Cleveland Graphite Bronze Co., Cleveland, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Green Fuel Economizer Co., Beacon, N. Y.
International Powder Metallurgy, Inc., Ridgway, Pa.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
● Randall Graphite Bearings, Inc., Chicago, Ill.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELLOWS, THERMOSTATIC AND METALLIC

● Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Bridgeport, Conn.
● Chicago Metal Hose Corp., Maywood, Ill.
Clifford Mfg. Co., Boston, Mass.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
● Sterling, Inc., Milwaukee, Wis.

BELTING, FLAT, LEATHER

Alexander Bros., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Chicago Belting Co., Chicago, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dick Co., Inc., R. & J., Passaic, N. J.
Garlock Packing Co., Palmyra, N. Y.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, V

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
● Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.

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Jones Foundry & Machine Co., W. A., Chicago, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Schieren Co., Chas. A., New York, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
● Worthington Pump & Machinery Corp., Harris, N. J.

BENDERS, PIPE

American Pipe Bending Machine Co., Inc., Poultney, Vt.
American Pipe Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Crown Die & Tool Co., Chicago, Ill. (Hand)
Electric Cord Co., New York, N. Y.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
● Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Radiant Devices, St. Louis, Mo.
Sac Tool Mfg. Co., St. Louis, Mo.
● Tal Bender, Inc., Milwaukee, Wis.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.
Watson-Stillman Co., Roselle, N. J.

BENDERS, TUBING

American Pipe Bending Machine Co., Inc., Poultney, Vt.
Armstrong Mfg. Co., Bridgeport, Conn.
Bernz Co., Otto, Rochester, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Everhot Products Co., Chicago, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
● Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Leonard Precision Products Co., Garden Grove, Calif.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Parker Appliance Co., The, Cleveland, O.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Steel City Electric Co., Pittsburgh, Pa.
● Tal Bender, Inc., Milwaukee, Wis.
Wallace Supplies Mfg. Co., Chicago, Ill.
Watson-Stillman Co., Roselle, N. J.

BENDS, EXPANSION, STEAM PIPE

American Locomotive Co., Alco Products Div., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill. (Stainless & non-ferrous)
Kellogg Co., M. W., The, New York, N. Y. (Corrugated steel)
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
● Rempe Co., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
● Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
● Whitlock Mfg. Co., Hartford, Conn.

BI-METALS, THERMOSTATIC

Baker & Co., Inc., Newark, N. J.
Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Co., H. A., The, Newark, N. J.

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aerovent Fan Co., Inc., Piqua, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Alliance Mfg. Co., Alliance, O.
Burden Co., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
● DeBothezat Fans Div., American Machine & Metals, Inc., East
Ill.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Gates Engineering Co., Wilmington, Del.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
International Engrg. Inc., Dayton, O.
● Joy Mfg. Co., Pittsburgh, Pa.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Motionair Co., Los Angeles, Calif.
Meyers Electric Co., Inc., Pittsburgh, Pa.
Norwin Co., Freeport, Ill.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Peerless Electric Co., Warren, O.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Roto-Beam, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
● South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
● Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Finned, Heating

BLAST HEATING COILS

See Surface, Finned, Heating

BLINDS, LINE, PIPE

Hamer Oil Tool Co., Long Beach, Cal.

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Housings, Fan

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

● Aladdin Heating Corp., Oakland, Calif.
Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
● American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Carling Turbine Blower Co., Worcester, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
Combustion Systems Div., Vapofier Corp., Chicago, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
● General Blower Co., Morton Grove, Ill.
● Ingersoll-Rand Co., New York, N. Y.
Johnson Fan & Blower Corp., Chicago, Ill.
● Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Fan & Blower Co., Chicago, Ill.

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National Machine Works, Chicago, Ill.
North American Mfg. Co., Cleveland, O.
● Prat-Daniel Corp., East Port Chester, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Trimount Rotary Power Co., Dedham, Mass.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
● Wing Mfg. Co., L. J., New York, N. Y.

BLOWERS, SOOT

Bayer Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Perfection Grate & Stoker Co., Springfield, Mass.

BLOW-OFF VALVES

See Valves, Blow-off

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOILER CLEANING COMPOUNDS

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BOILER FEED PUMPS

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BOILER FEEDERS

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BOILER GAGES

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BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 Sq Ft Steam Radiation and Over

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bryan Steam Corp., Peru, Ind.
Bryant Heater Co., Cleveland, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Columbia Radiator Co., McKeesport, Pa.
● Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Herbert Boiler Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
Mueller Furnace Co., L. J., Milwaukee, Wis.
● National Radiator Co., The, Johnstown, Pa.
● Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Radiator Co., New York, N. Y.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
● Surface Combustion Corp., Toledo, O.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 Sq Ft Steam Radiation and Over

● Aldrich Co., The, Wyoming, Ill.
Alert Engineering Products, Detroit, Mich.
American Shipbuilding Co., Cleveland, O.
● Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Dillon Steam Boiler Wks., Inc., D. M. Fitchburg, Mass.
Dutton Co., C. H., Kalamazoo, Mich.
Erie City Iron Wks., Erie, Pa.
Farrar & Treits, Buffalo, N. Y.
Federal Boiler Co., Inc., Midland Park, N. J.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
Frost Mfg. Co., Galesburg, Ill.
Gallaher Boiler Co., St. Louis, Mo.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks, East Boston, Mass.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Loline Steel Boiler Co., Allentown, Pa.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Manitowoc Boiler Wks., Manitowoc, Wis.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Murray Iron Wks. Co., Burlington, Ia.
● National Radiator Co., The, Johnstown, Pa.
Orr & Sembower, Inc., Reading, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
● Terre Haute Boiler Works Co., Terre Haute, Ind.
Titusville Iron Wks. Co., The, Titusville, Pa.
Union Iron Wks., Erie, Pa.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, WATER TUBE

Anetsberger Bros., Chicago, Ill.
Babcock & Wilcox Co., New York, N. Y.
Bigelow Co., The, New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Central States Steel Boiler Co., Chicago, Ill.
Combustion Engineering Co., New York, N. Y.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Edge Moor Iron Wks., Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
Gold Top Heating, Inc., Butte, Mont.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Inc., Framingham, Mass.
Keeler Co., E., Williamsport, Pa.
Morheat Corp., Lansing, Mich.
Murray Iron Wks., Co., Burlington, Ia.
Riley Stoker Corp., Worcester, Mass.
Springfield Boiler Co., Springfield, Ill.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Super Mold Corp., Lodi, Calif.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Heating Corp., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.
Will-Burt Co., The, Orrville, O.

BOILERS, PACKAGED STEAM GENERATING UNITS, HEATING AND PROCESS

Alert Engineering Products, Detroit, Mich.
● Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Bigelow Co., New Haven, Conn. (electric)
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brown Fintube Co., The, Elyria, O.
● Brownell Co., Dayton, O.
Bryan Steam Corp., Peru, Ind.
Clayton Mfg. Co., El Monte, Calif.
● Cleaver-Brooks Co., Milwaukee, Wis.
Cronholm Mfg. Co., Portland, Ore. (Electrical)
Custom Engineering Co., Los Angeles, Calif. (electric)
Cyclotherm Corp., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Erie City Iron Works, Erie, Pa.
Foster Wheeler Corp., New York, N. Y.
International Boiler Works Co., East Stroudsburg, Pa.
International Engineering Works, Inc., Framingham, Mass.
Johnson Co., S. T., Philadelphia, Pa.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.
Leffel & Co., James, Springfield, O.
Livingstone Engineering Co., Worcester, Mass.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Martin Co., Inc., J. O., San Francisco, Calif.
Martin-Quaid Co., Philadelphia, Pa.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Morheat Corp., Lansing, Mich.
Orr & Sembower, Inc., Reading, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
● Sellers Engineering Co., Chicago, Ill.
Stout & Sons, David, St. Louis, Mo.
Superior Combustion Industries, Inc., Emmaus, Pa.

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Thermal Engineering Co., Chicago, Ill.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Heating Corp., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Western Piping & Engineering Co., San Francisco, Calif.
Wickes Boiler Co., Saginaw, Mich.
York-Shipley, Inc., York, Pa.

BOLTS, EXPANSION

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Rolyan Metal Products, Chicago, Ill.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

● Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
● Crane Co., Chicago, Ill.
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Chicago, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Pheoll Mfg. Co., Chicago, Ill.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS, TOGGLE AND ANCHOR

Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Manasquan, N. J.
Grabler Mfg. Co., Cleveland, O.
Industrial Screw Co., Chicago, Ill.
Meco, Inc., Portland, Ore.
Moore Co., Goodloe E., Danville, Ill.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOOTHS, PAINTING, SPRAY

Binks Mfg. Co., Chicago, Ill.
Centri-Spray Corp., Detroit, Mich. (wet type)
Circulators & Devices Mfg. Corp., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Barth Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Excelsior Tool & Machine Co., East St. Louis, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
St. Louis Tool Co., St. Louis, Mo.
Webb Machine & Tool Co., Coraopolis, Pa.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Dreis & Krump Mfg. Co., Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Harris, A. R., Hammond, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Webb Machine & Tool Co., Coraopolis, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The, Cleveland, O.
Cincinnati Shaper Co., Cincinnati, O.
Dreis & Krump Mfg. Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O.
Munton Mfg. Co., Franklin Park, Ill.
Niagara Machine & Tool Works, Buffalo, N. Y.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Verson Allsteel Press Co., Chicago, Ill.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.
Wilson Co., K. R., Buffalo, N. Y.

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING TORCHES

See Torches, Brazing

BREAKERS, VACUUM (For Steam Using Equipment)

Bailey Co., Chas. M., San Francisco, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Barber Gas Burner Co., Cleveland, O.
Barton Co., Minneapolis, Minn.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Combustion Systems Div., Vapofier Corp., Chicago, Ill.
Coppus Engineering Corp., Worcester, Mass.
Dalzen Tool & Mfg. Co., Detroit, Mich.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Engineer Co., New York, N.Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Finn Engineers, Jerry, St. Paul, Minn.
Gold Top Heating, Inc., Butte, Mont.
● Haney Gas Burner & Engineers, Monrovia, Calif.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kindl-Air Corp., Cleveland, O.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, M
Martin Co., Inc., J. O., San Francisco, Calif.
● Mettler Co., Lee B., Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Newcomb-Detroit Co., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Payne Furnace Co., Beverly Hills, Calif.
Peabody Engrg. Corp., New York, N. Y.
● Ray Oil Burner Co., San Francisco, Calif.
● Reinhard Brothers Co., Minneapolis, Minn.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.
● Sellers Engineering Co., Chicago, Ill.
Sonner Burner Co., Winfield, Kan.
Staples & Pfeiffer, San Francisco, Calif.
Standard Fuel & Engineering Co., Detroit, Mich.
Stout & Sons, David, St. Louis, Mo.
● Surface Combustion Corp., Toledo, O.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
● Webster Engineering Co., Tulsa, Okla.
Williams, Inc., F. C., Dearborn, Mich.
● Zink Co., John, Tulsa, Okla.

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BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Auburn Burner Co., Auburn, Ind.
Babcock & Wilcox Co., New York, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
● Haney Gas Burner & Engineers, Monrovia, Calif.
Johnson Co., S. T., Philadelphia, Pa.
Lammert & Mann Co., Chicago, Ill.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
● Mettler Co., Lee B., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Pan-American Engineering Co., Berkeley, Calif.
Peabody Engineering Corp., New York, N. Y.
● Ray Oil Burner Co., San Francisco, Calif.
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., Emmaus, Pa.
● Surface Combustion Corp., Toledo, O.
Thermal Engineering Co., Chicago, Ill.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
● Webster Engineering Co., Tulsa, Okla.
● Zink Co., John, Tulsa, Okla.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

● Ace Engineering Co., Chicago, Ill. (Rotary)
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Aldrich Co., The, Wyoming, Ill.
American Heat Corp., Boston, Mass. (Steam atomizing)
Babcock & Wilcox Co., New York, N. Y.
Best Combustion Equipment Co., Inc., W. N., New York, N. Y.
Caloroil Burner Corp., Hartford, Conn.
Catskill Metal Works, Inc., Catskill, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Century Engrg. Corp., Cedar Rapids, Ia.
Chandler Co., Cedar Rapids, Ia.
Chisholm Co., Allen E., Portland, Ore.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Dalmo-Victor Co., San Carlos, Calif.
Eckhart Mfg. Co., Roselle, N. J. (High pressure atomizing)
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Engineering Co., New York, N. Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Fuel Savers, Inc., Harrisburg, Pa. (high pressure)
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hardinge Mfg. & Oil Burner Co., Chicago, Ill.
Harvey-Whipple, Inc., Springfield, Mass.
Holtum Mfg. Co., Freeport, Ill.
Iron Fireman Mfg. Co., Cleveland, O. (Rotary atomizing, high pressure atomizing)
● Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Philadelphia, Pa.
Kleen-Heet, Inc., Chicago, Ill.
Lammert & Mann Co., Chicago, Ill.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Lieblich Oil Burner Inc., New York, N. Y.
Lientz Co., B. P., Kansas City, Mo. (steam atomizing)
Littleford Bros., Cincinnati, O.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Malleable Iron Fittings Co., Branford, Conn. (High pressure atomizing)
● Mettler Co., Lee B., Los Angeles, Calif.
Montag Stove & Furnace Works, Portland, Ore.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Oil Burner Co. of N. Y. Inc., Brooklyn, N. Y. (Horizontal rotary)
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., The, Rock Island, Ill.
Pan-American Engineering Co., Berkeley, Calif.
Peabody Engrg. Corp., New York, N. Y.
● Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Ray Oil Burner Co., San Francisco, Calif. (High pressure atomizing rotary)
Rayfield Co., C. L., Chicago, Ill. (Low pressure atomizing)
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Richfield Mfg. Corp., Baldwin, L. I., N. Y. (high pressure gun type)
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Simplex Oil Heating Corp., New York, N. Y. (Low and high pressure atomizing, and horizontal rotary types)
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., Emmaus, Pa.
Thermal Engineering Co., Chicago, Ill.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y. (Variable capacity, rotary, pressure atomizing steam atomizing)
U. S. Machine Corp., Lebanon, Ind.
Vapofier Corp., Chicago, Ill. (Pre-mixed gaseous fuel generator)
● Webster Engineering Co., Tulsa, Okla.

Will-Burt Co., The, Orrville, O. (High pressure)
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York-Shipley, Inc., York, Pa. (Rotary)
● Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Engineer Co., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CAPS, VENT FLUE

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Airjet Ventilator Co., Pasadena, Calif.
Breidert Co., G. C., Los Angeles, Calif.
King Gauge & Mfg. Co., New Haven, Conn.
Penn Ventilating Co., Philadelphia, Pa.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon and Graphite

CAST IRON PIPE

See Pipe, Cast Iron

CEMENT AND COMPOUNDS, PIPE JOINT

Acme Refining Co., The, Cleveland, O.
Acorn Refining Co., Cleveland, O.
Akron Metallic Gasket Co., Akron, O.
Arco Co., Cleveland, O.
Atlas Chemical Co., Marietta, O.
Babbitt Chemical Specialties Co., New York, N. Y.
Baer Bros., New York, N. Y.
Black Magic Products Co., Tulsa, Okla.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Specialty Mfg. Co., Chicago, Ill.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Continental Products Co., Euclid, O.
Cooper Sanitary Co., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.
Diamond Chemical Products, New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Felt Products Mfg. Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
● Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Kenite Laboratory Inc., New York, N. Y.
● Key Co., East St. Louis, Ill.
Keystone Asphalt Products Co., Chicago, Ill.
Krehbiel Co., J. H., Chicago, Ill.
Lake Chemical Co., Chicago, Ill.
Macksons Co., New York, N. Y.
Metropolitan Refining Co., Inc., Long Island City, N. Y.

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Milwaukee Gas Specialty Co., Milwaukee, Wis.
Montgomery Bros., San Francisco, Calif.
National Engineering Products, Inc., Washington, D. C.
Nebel Mfg. Co., Cleveland, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Pecora Paint Co., Inc., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Schundler & Co., F. E., Long Island City, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Star Products Co., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wilhelm Co., A., Reading, Pa.
X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Co., Detroit, Mich.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Continental Products Co., Euclid, O.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tamms Silica Co., Chicago, Ill.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Walsh Refractories Corp., St. Louis, Mo.
● Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Carney Co., Inc., The, Mankato, Minn.
Chicago Fire Brick Co., Chicago, Ill.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Green Fire Brick Co., A. P., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (85 per cent magnesia)
Krehbiel Co., J. H., Chicago, Ill. (Asbestos, mineral wool)
Laclede-Christy Clay Products Co., St. Louis, Mo.
Moore Co., Goodloe E., Danville, Ill.
Munn and Steele, Inc., Newark, N. J.
National Engineering Products, Inc., Washington, D. C.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., The., Insulation Div., San Francisco
Peterson Co., B. A., Dowagiac, Mich.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa. (Electrical)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Mineral Wool Co., South Milwaukee, Wis.
● Wilson, Inc., Grant, Chicago, Ill.
● Zonolite Co., Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CHAIN DRIVES

See Drives, Chain

CHAMBERS, COMBUSTION, PREFORMED

Amerform Corp., Philadelphia, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Chicago Fire Brick Co., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
McLeod & Henry Co., Inc., Troy, N. Y.
Monogram Products Co., Philadelphia, Pa.
Munn and Steel, Inc., Newark, N. J., (light fired refractory)
Peterson Co., B. A., Dowagiac, Mich.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Stuart Co., W. W., Des Moines, Ia.
Walsh Refractories Corp., St. Louis, Mo.
● Zonolite Co., Chicago, Ill.

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

Tenney Engineering, Inc., Newark, N. J.
York Corp., York, Pa.

CHANGERS, SPEED, HYDRAULIC COUPLING

● American Blower Corp., Detroit, Mich.
CraneVeyor Corp., Los Angeles, Calif.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Link-Belt Co., Philadelphia, Pa.

CHANGERS, SPEED, MAGNETIC

Electric Machinery Mfg. Co., Minneapolis, Minn.
Reliance Electric & Engineering Co., Cleveland, O.

CHANGERS, SPEED, MECHANICAL

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Doall Co., The, Des Plaines, Ill.
Graham Transmissions, Inc., Milwaukee, Wis.
Lewellen Mfg. Co., Columbus, Ind.
Lima Electric Motor Co., Lima, O.
Link-Belt Co., Philadelphia, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Master Electric Co., Dayton, O.
Reeves Pulley Co., Columbus, Ind.
Salsbury Motors, Inc., Pomona, Calif.
Standard Transmission Equipment Co., Pasadena, Calif.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wel ville, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Webster Electric Co., Racine, Wis.
White Mfg. Co., St. Paul, Minn.
● Worthington Pump & Machinery Corp., Harrison, N. J.

CHECK VALVES

See Valves, Check

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CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

● Acme Industries, Inc., Jackson, Mich.
● Baker Ice Machine Co., Inc., South Windham, Me.
Condenser Service & Engineering Co., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Filtrine Mfg. Co., Brooklyn, N. Y.
● Frick Co., Waynesboro, Pa.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howe Ice Machine Co., Chicago, Ill.
Larkin Coils, Atlanta, Ga.
● McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering Corp., Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Temprite Products Corp., Detroit, Mich.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
● Whitlock Mfg. Co., Hartford, Conn.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

American-Marsh Pumps, Inc., Battle Creek, Mich.
● Bell & Gossett Co., Morton Grove, Ill.
Columbus Steam Pump Works Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Quality Specialty Co., Inc., Philadelphia, Pa.
Standard Electric Mfg. Co., West Berlin, N. J.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
● Weil Pump Co., Chicago, Ill.
White Flomatic Corp., Hoosick Falls, N. Y.
Yula Water Heaters Inc., New York, N. Y.

CLAMPS, BEAM, PIPE HANGING

Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Carpenter & Paterson, Inc., East Boston, Mass.
Chicago Nipple Mfg. Co., Cicero, Ill.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
● Frick Co., Waynesboro, Pa.
Genspring, Inc., New York, N. Y.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Moore Co., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Chicago, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
● Walworth Co., New York, N. Y.

CLAMPS, HOSE

Everhot Products Co., Chicago, Ill.
Flexible Tubing Corp., Branford, Conn.
Marman Products Co., Inc., Inglewood, Calif.
Tinnerman Products, Inc., Cleveland, O.

CLAMPS, PIPE REPAIR

Altens Foundry & Machine Works, Inc., Lancaster, O.
Chelsea Metal Stamping Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Jarecki Mfg. Co., Erie, Pa.
Marman Products Co., Inc., Inglewood, Calif.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Skinner Co., M. B., South Bend, Ind.
Smooth-On Mfg. Co., Jersey City, N. J.
● Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

Detroit Stamping Co., Detroit, Mich.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Jewel Mfg. Co., St. Paul, Minn.
Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

● American Air Filter Co., Inc., Louisville, Ky.
Bartlett Hayward, Div. of Koppers Co., Baltimore, Md.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y. & Columbus, O.
Raytheon Mfg. Co., Commercial Products Div., Waltham, Mass.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Thermix Corp., The, Greenwich, Conn.
Trion, Inc., McKees Rocks, Pa.

CLEANERS, TUBE

Armstrong Mfg. Co., Bridgeport, Conn.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Condenser Service & Engineering Co., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Perfection Grate & Stoker Co., Springfield, Mass.
Pierce Co., Wm. B., The, Buffalo, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Spencer Turbine Co., Hartford, Conn.
York Corp., York, Pa.

CLEANERS, VACUUM, FOR BOILERS

Ideal Industries, Inc., Sycamore, Ill.
Spencer Turbine Co., Hartford, Conn.

CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

CLEANING MACHINES, PIPE

See Machines, Pipe Cleaning

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Aeroil Products Co., West New York, N. J.
Alrose Chemical Co., Providence, R. I.
Amercoat Div., American Pipe & Construction Co., South Gate, Calif.
American Chemical Paint Co., Ambler, Pa.
American Hard Rubber Co., New York, N. Y. (hard & soft rubber)
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
● Apex Engineering Co., Chicago, Ill. (Water cured protective tank lining for field application only)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y. (Pitchbase)
Bart Mfg. Co., Inc., Belleville, N. J.
Blue Ridge Talc Co., Inc., Henry, Va.
Bonafide Genasco, Inc., New York, N. Y.
Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Cabot Inc., Samuel, Boston, Mass. (Bituminous black paint)
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (anodizing chemical oxidizing for aluminum)
Condenser Service & Engineering Co., Inc., Hoboken, N. J. (Metal spray)
Cordo Chemical Co., Norwalk, Conn.
Dampney Co. of America, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y.
Dow Corning Corp., Midland, Mich.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Galv-Weld Products, Dayton, O. (Regalvanizing)
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O.

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Haering & Co., Inc., D. W., Chicago, Ill. (Drying and non-drying)
Hardy, Inc., Charles, New York, N. Y. (18-8 stainless steel paste)
● Heresite & Chemical Co., Manitowoc, Wis. (Synthetic)
Houghton & Co., E. F., Philadelphia, Pa.
Industrial Metal Protectives, Inc., Dayton, O.
Interchemical Corp., Finishes Div., Newark, N. J.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Kellogg Co., M. W., The, New York, N. Y. (Heat resisting)
Knight, Maurice A., Akron, O. (Vinyl plastic base)
Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa. (Coal tar)
Laclede-Christy Clay Products Co., St. Louis, Mo. (High temperature paint)
Lastik Products Co., Inc., Pittsburgh, Pa.
Lithgow Corp., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Midland Paint & Varnish Co., Cleveland, O.
Miracle Adhesives, Corp., New York, N. Y.
Monsanto Chemical Co., Merimac Div., Boston, Mass. (synthetics)
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
National Lead Co., New York, N. Y. (Red lead)
National Lining Co., Chicago, Ill. (Water cured protective tank lining for field application only)
National Pipe Coatings, Inc., Los Angeles, Calif.
Nebel Mfg. Co., Cleveland, O.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Nooter Boiler Works Co., John, St. Louis, Mo. (Metal spray, lead burning alloy sheet)
Ohmlac Paint & Refining Co., New York, N. Y. (Acid resistant, heat resistant)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perolin Co., Inc., Chicago, Ill.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, lacquer)
Presstite Engineering Co., St. Louis, Mo.
Protective Coatings, Inc., Detroit, Mich.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
● Ric-wiL Co., Cleveland, O.
Robertson Co., H. H., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J. (Tank coatings, rust preventive)
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga. (Metallic paint)
Special Chemicals Corp., New York, N. Y. (Aluminum paint)
Tropical Paint & Oil Co., Cleveland, O.
Turco Products, Inc., Los Angeles, Calif.
United Chromium, Inc., New York, N. Y. (Chemical resisting organic coating)
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
Vesco Corp., New York, N. Y.
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Boston, Mass.
Wolfe-Kote Co., Inc., Sheboygan, Wis.
X-Pando Corp., Long Island City, N. Y. (Anti-corrosive)

COCKS, BOILER GAGE

Bordo Co., Inc., L. J., Glenside, Pa.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Klingerit, Inc., New York, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Marsh Corp., Jas. P., Skokie, Ill.
Reliance Gauge Column Co., Cleveland, O.
Swift Lubricator Co., Elmira, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.
Williams Valve Co., D. T., Cincinnati, O.
Wright-Austin Co., Detroit, Mich.

COILS

See Surface, Cooling; Surface, Heating

COILS, CONDENSATION

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Lewis & Co., Joseph E., Baltimore, Md.
Parker Appliance Co., The, Cleveland, O.

COILS, FOR HOT WATER STORAGE TANKS

Adams Co., The, Dubuque, Ia.
American Cooling Tower Co., Kansas City, Mo.
American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Everhot Products Co., Chicago, Ill.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
National Pipe Bending Co., New Haven, Conn.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Taco Heaters, Inc., Providence, R. I.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
● Whitlock Mfg. Co., Hartford, Conn.

COILS AND PANELS, RADIANT HEATING, PREFABRICATED

Atlantic Pipebending & Fabricating Corp., Edgewater, N. J.
Cannelton Sewer Pipe Co., RadianTile Div., Chicago, Ill. (Vitrified clay floor blocks and ducts for warm air)
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Even-Ray Co., Inc., Newark, N. J.
● Kritzer Radiant Coils, Inc., Chicago, Ill.
Pan-L-Heat Corp., Portland, Ore.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Radiant Heat Sales Engrg. Co., Gary, Ind.
Simplex Ceiling Co., New York, N. Y.

COILS, PIPE

● Acme Industries, Inc., Jackson, Mich.
American Cooling Towers Co., Kansas City, Mo.
B & M Mfg. Co., East Orange, N. J.
● Baker Ice Machine Co., Inc., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y. (lead, lead covered, and lead alloy)
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Harris & Co., Arthur, Chicago, Ill.
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lewis & Co., Joseph E., Baltimore, Md.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Ohio Pipe Bending & Machine Co., Cleveland, O.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
● Rempe Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Whitlock Mfg. Co., Hartford, Conn.

COLLECTION, DUST AND FUME, ULTRASONIC

Supersonics Corp. of America, New York, N. Y.
Ultrasonic Corp., Cambridge, Mass.

COLLECTORS, DUST

Aerotec Corp., The, Greenwich, Conn.
Aget-Detroit Co., Ann Arbor, Mich.
Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
Allington & Curtis Mfg. Co., Saginaw, Mich.
● American Air Filter Co., Inc., Louisville, Ky.
● American Blower Corp., Detroit, Mich.
American Metal Products Co., Fort Worth, Tex.
American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Bargar Sheet Metal Co., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
Blower Application Co., Milwaukee, Wis.
Bubar, Hudson H., Old Lyme, Conn.
● Buffalo Forge Co., Buffalo, N. Y.
Buffalo Tank Corp., Dunellen, N. J.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Chicago Blower Corp., Chicago, Ill.
Clark Dust Control Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Day Co., The, Minneapolis, Minn.

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Diamond Power Specialty Corp., Detroit, Mich.
Doall Co., The., Des Plaines, Ill.
Dust Filter Co., Chicago, Ill.
Dust Suppression & Engineering Co., Lake Orion, Mich.
Goethel Sheet Metal Wks., Alfred, Milwaukee, Wis.
Griffin & Co., Inc., Louisville, Ky.
Ideal Industries, Inc., Sycamore, Ill.
Indiana Fan Company, Indianapolis, Ind.
Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kluegel & Co., E., St. Paul, Minn.
Knickerbocker Co., Jackson, Mich.
Lumm Co., A. H., Toledo, O.
Newcomb-Detroit Co., Detroit, Mich.
Nooter Boiler Works Co., John, St. Louis, Mo.
Northern Blower Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Peters-Dalton, Inc., Detroit, Mich.
● Prat-Daniel Corp., East Port Chester, Conn.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Corp., New York, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schmieg Industries, Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sly Mfg. Co., W. W., Cleveland, O.
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldron & Co., Muncy, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Thermix Corp., The, Greenwich, Conn.
Torit Mfg. Co., St. Paul, Minn.
Wagner Awning & Mfg. Co., Cleveland, O. (Dust recovery bags)
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

COLORIMETERS

Ellison Draft Gage Co., Chicago, Ill.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Photovolt Corp., New York, N. Y.
Refinite Corp., Omaha, Neb.
Will Corp., Rochester, N. Y.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion; Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMPOUNDS, AIR FRESHENING

Air Correctives Inc., New York, N. Y.
Airkem, Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.

COMPOUNDS, BOILER CLEANING

Acme Refining Co., The, Cleveland, O.
Agnew & Tomlinson, Long Island City, N. Y.
American K. A. T. Corp., New York, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
● Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Brown-Ford Corp., Newton, Mass.
Cannon Chemical Co., Inc., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Diamond Chemical Products, New York, N. Y.
Dowell Inc., Tulsa, Okla.
Ferro-Nil Corp., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Hood Refining Co., Greensburg, Pa.
Kenite Laboratory Inc., New York, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Krehbiel Co., J. H., Chicago, Ill.
MacDermid Chemical Co., Bristol, Conn.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Jersey City, N. J.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Ampion Corp., Long Island City, N. Y.
Atlas Chemical Co., Marietta, O.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Cooper Sanitary Co., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory Inc., New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Engineering Products, Inc., Washington, D. C.
Penetone Co., The, Tenafly, N. J.
Permatex Co., Inc., Brooklyn, N. Y.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Star Products Co., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Utility Laboratories, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CLEANING, AIR FILTER

National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
● Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Everett, Mass.
Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Dearborn Chemical Co., Chicago, Ill.
● Dowell Inc., Tulsa, Okla.
Haering & Co., Inc., D. W., Chicago, Ill.
Hercules Chemical Co., Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
North American Fibre Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory Inc., Brooklyn, N. Y.
Western Chemical Co., Kansas City, Mo.

COMPOUNDS, WELDING

Acme White Lead & Color Wks., Detroit, Mich.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Allen Co., Inc., L. B., Chicago, Ill.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
American Solder & Flux Co., Philadelphia, Pa.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Midland Paint & Varnish Co., Cleveland, O.
Neilson Chemical Co., Detroit, Mich.
Powder Weld Process Co., The, Brooklyn, N. Y. (Powdered)
Presstite Engineering Co., St. Louis, Mo.
Sight Feed Generator Co., Richmond, Ind.
Special Chemicals Corp., New York, N. Y.
Thompson & Co., Oakmont, Pa.
Turco Products, Inc., Los Angeles, Calif.
Universal Power Corp., Cleveland, O.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

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COMPRESSION PIPE FITTINGS

See Fittings, Pipe, Compression

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSOR VALVES

See Valves, Compressor

COMPRESSORS, AIR

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
Binks Mfg. Co., Chicago, Ill.
Brunner Mfg. Co., Utica, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper-Bessemer Corp., Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davey Compressor Co., Kent, O.
Dayton Air Compressor Co., Dayton, O.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasaqua, Pa.
● Gardner-Denver Co., Quincy, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hobart Bros. Co., Troy, O.
● Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Nash Engineering Co., South Norwalk, Conn.
North Penn Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Plummer Spray Equipment Co., Napoleon, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Schramm, Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Trimount Rotary Power Co., Dedham, Mass.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

● Carrier Corp., Syracuse, N. Y. (Carrene)
DeLaval Steam Turbine Co., Trenton, N. J. (Water vapor)
● Trane Co., The, LaCrosse, Wis.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, RECIPROCATING

Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial)
● Baker Ice Machine Co., Inc., South Windham, Me. ("Freon," Methyl chloride, Ammonia)
Brunner Mfg. Co., Utica, N. Y. (Methyl chloride, "Freon," sulphur dioxide)
● Carrier Corp., Syracuse, N. Y. ("Freon")
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
Copeland Refrigeration Corp., Sidney, O.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
● Frick Co., Waynesboro, Pa. (Ammonia, carbon dioxide, methyl chloride, "Freon")
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Machinery Co., Spokane, Wash.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Howe Ice Machine Co., Chicago, Ill. ("Freon," ammonia, methyl chloride)
● Ingersoll-Rand Co., New York, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Liberty Motors & Engineering Corp., Arbutus, Baltimore, Md.
Lynch Mfg. Corp., Toledo, O.
Mills Industries, Inc., Chicago, Ill.
Ready-Power Co., The, Detroit, Mich. (radial unit driven by direct-connected internal combustion engine)
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia)
Reynolds Mfg. Co., Inc., Springfield, Mo.
Schnacke, Inc., Evansville, Ind.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind. ("Freon")
Starr Piano Co., Richmond, Ind.
Stewart Ice Machine Co., Pomona, Calif.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Tecumseh Products Co., Tecumseh, Mich.
● Trane Co., The, LaCrosse, Wis.
Universal Cooler Div. of International Detrola Corp., Marion, O (Methyl chloride, "Freon")
Vilter Mfg. Co., Milwaukee, Wis. ("Freon," ammonia)
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill. ("Freon," methyl chloride)
Wittenmeier Machinery Co., Chicago, Ill. (Carbon dioxide)
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill. (Ammonia, methyl chloride)
York Corp., York, Pa. (Carbon dioxide, ammonia, "Freon")

COMPRESSORS, REFRIGERATING, STEAM JET

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

COMPRESSORS, STEAM BOOSTER

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bury Compressor Co., Erie, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
● Worthington Pump & Machinery Corp., Harrison, N. J.

CONDENSATE RETURN

See Pumps, Condensation Return; Systems, Condensate Return

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSER TUBES

See Tubes, Condenser

CONDENSERS, REFRIGERATING, EVAPORATIVE

● Acme Industries, Inc., Jackson, Mich.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
● Baker Ice Machine Co., South Windham, Me.
● Baltimore Aircoil Co., Inc., Baltimore, Mr.
Betz Corp., Hammond, Ind.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y. ("Freon," ammonia)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
● G & O Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Harry Cooling Towers, Inc., New York, N. Y.
Hess Co., The, Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Long Mfg. Div. Borg-Warner Corp., Detroit, Mich.
● Marlo Coil Co., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Ristow, R. E., Los Angeles, Calif.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.

● Advertisement in this issue. See Index to Advertisers, pages 411-412

Vilter Mfg. Co., Milwaukee, Wis.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND COIL

● Acme Industries, Inc., Jackson, Mich.
American Coils Co., Newark, N. J.
● Baker Ice Machine Co., Inc., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Champion Unit Heater Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Halstead & Mitchell, Pittsburgh, Pa. (Double tube)
Industrial Mfg. & Engineering Co., Chicago, Ill.
Nooter Boiler Works Co., John, St. Louis, Mo.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
● Whitlock Mfg. Co., Hartford, Conn.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

● Acme Industries, Inc., Jackson, Mich.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Coils Co., Newark, N. J.
Andale Co., Philadelphia, Pa.
● Baker Ice Machine Co., Inc., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
● Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E., Akron, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
● Carrier Corp., Syracuse, N. Y. (Carrene)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
● National Radiator Co., The, Johnstown, Pa.
Nooter Boiler Works Co., John, St. Louis, Mo.
Ohio Pipe Bending & Machine Co., Cleveland, O.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reliance Refrigerating Machine Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Richmond Engrg. Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schnacke, Inc., Evansville, Ind.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stewart Ice Machine Co., Pomona, Calif.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Steam Pump Co., Battle Creek, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Whitlock Mfg. Co., Hartford, Conn.
Wittenmeier Machinery Co., Chicago, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUCTORS, ELECTRICAL, FOR RADIANT HEATING

Continental Radiant Glass Heat Corp., New York, N. Y.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Electradiant Corp., Monterey, Calif.
Roberson Co., L. N., Seattle, Wash.
United States Rubber Co., New York, N. Y.

CONDUIT, UNDERGROUND PIPING

American District Steam Co., North Tonawanda, N. Y.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Dockstader, Inc., S. E., Washington, D. C.
● Durant Insulated Pipe Co., Palo Alto, Calif.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Johns-Manville, New York, N. Y.
Kaiser Co., E. B., Chicago, Ill.
Michigan Pipe Co., Bay City, Mich.
Orangeburg Mfg. Co., Orangeburg, N. Y.
● Porter & Co., Inc., H. W., Newark, N. J.
● Ric-wiL Co., Cleveland, O.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

● Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
Canvas Products Co., St. Louis, Mo.
● Chicago Metal Hose Corp., Maywood, Ill.
Felters Company, The, Boston, Mass.
St. Clair Rubber Co., Detroit, Mich.
United States Rubber Co., New York, N. Y.
Wagner Awning & Mfg. Co., Cleveland, O.
● Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

CONNECTORS, FILLING, HYDROSTATIC TEST

Mechanical Products Corp., Chicago, Ill.
Roylyn, Inc., Glendale, Calif.

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

Acme Steel Co., Chicago, Ill. (Strapping)
Klomparens Lock-Joint Mfg. Co., Inc., Washington, D. C.
Lumm Co., A. H., Toledo, O.
Sheetlock Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.

CONTINUOUS HEATERS

See Heaters, Steam Jet, for Liquids

CONTROL, FOR INDIRECT WATER HEATERS

Armstrong Control Co., Inc., Portland, Ore.
● Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
Klipfel Mfg. Co., Hamilton, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

CONTROLLERS AND STARTERS, MOTOR

● Allen-Bradley Co., Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Borg-Erickson Corp., Chicago, Ill.
Chase-Shawmut Co., Newberyport, Mass.
Clark Controller Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Co., Minneapolis, Minn. (Synchronous motor)

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Fitch, Allen & Co., Chicago, Ill.
● General Electric Co., Apparatus Dept., Schenectary, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
● Penn Electric Switch Co., Goshen, Ind.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
● Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.
Stanley Works, The, New Britain, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
Yale & Towne Mfg. Co., Stamford, Conn.

CONTROLS, DRAFT, BAROMETRIC

Atlas Utilities Co., Inc., Providence, R. I.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Campbell Engineering Co., Appleton, Wis.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fuelguard Co., Dallas, Tex.
Hotstream Heater Co., Cleveland, O.
● Krueger Sentry Gauge Co., Green Bay, Wis.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Simplex Mfg. Co., Fond du Lac, Wis.
United States Radiator Corp., Detroit, Mich.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

American District Telegraph Co., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Synchro-Start Products, Inc., Chicago, Ill.
Worner Electronic Devices, Rankin, Ill.

CONTROLS, FLAME FAILURE

American District Telegraph Co., New York, N. Y.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Combustion Control Corp., Cambridge, Mass.
Drying Systems, Inc., Chicago, Ill.
Ess Specialty Corp., Bergenfield, N. J.
Fuelguard Co., Dallas, Tex.
Furst Electronics, Chicago, Ill.
● General Controls Co., Glendale, Calif.
● General Electric Co. Apparatus Dept., Schenectady, N. Y.
General Power Plant Corp., New York, N. Y.
Haney Gas Burner & Engrs., Monrovia, Calif.
● Mercoid Corp., The, Chicago, Ill.
● Mettler Co., Lee B., Los Angeles, Calif.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Co., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regutors; Relays; Switches; Systems, Combustion Control; Systems, Heating; Thermostats; Valves, Balancing, Radiator; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valve; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

CONVECTORS

See Radiation, Convection Type

CONVEYORS, COAL AND ASH

Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chain Belt Co., Milwaukee, Wis.
CraneVeyor Corp., Los Angeles, Calif.
Farquhar Co., A. B., York, Pa.
Hager Bros., Rockford, Ill.
Jeffrey Mfg. Co., Columbus, O.
● Joy Mfg. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Sprout, Waldron & Co., Muncy, Pa.
Standard Transmission Equipment Co., Pasadena, Calif.
● Stephens-Adamson Mfg. Co., Aurora, Ill.

COOLERS, CRANE CAB

● Dravo Corp., Machinery Div., Pittsburgh, Pa.
● Trane Co., The, LaCrosse, Wis.

COOLERS, OIL

Andale Co., Philadelphia, Pa.
American Cooling Tower Co., Kansas City, Mo.
American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
● G & O Mfg. Co., New Haven, Conn.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Pipe Bending Co., New Haven, Conn.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Refrigeration Economics Co., Inc., Canton, O.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Titusville, Pa.
Taco Heaters, Inc., Providence, R. I.
● Trane Co., The, LaCrosse, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Whitlock Mfg. Co., Hartford, Conn.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

● Acme Industries, Inc., Jackson, Mich.
● American Blower Corp., Detroit, Mich.
● Baker Ice Machine Co., Inc., South Windham, Me.
● Baltimore Aircoil Co., Inc., Baltimore, Md.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
● Frick Co., Waynesboro, Pa.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.

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● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Temp-Control Inc., Peoria, Ill.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Auburn Burner Co., Auburn, Ind.
● Baker Ice Machine Co., Inc., South Windham, Me.
Bern's Specialty Mfg. Co., Chicago, Ill.
Betz Corp., Hammond, Ind.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Johnson Fan & Blower Corp., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
● King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
● Skinner Heating & Ventilating Co., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Thermal Co., Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Engineering Corp., Chicago, Ill.
● Wing Mfg. Co., L. J., New York, N. Y.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

COOLERS, WATER, DRINKING

Copeland Refrigeration Corp., Sidney, O.
Day & Night Mfg. Co., Refrigeration Div., Monrovia, Calif.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Filtrine Mfg. Co., Brooklyn, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Halstead & Mitchell, Pittsburgh, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Refrigeration Engineering Corp., Philadelphia, Pa.
Sunroc Refrigeration Co., Glen Riddle, Pa.
Temprite Products Corp., Detroit, Mich.
Uniflow Mfg. Co., Erie, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.

COOLING COILS

See Surface, Cooling

COOLING SURFACE

See Surface, Cooling

COOLING TOWERS

See Towers, Cooling

COOLING UNITS

See Units, Air Conditioning; Coolers, Unit

COPPER PIPE

See Pipe, Brass and Copper

COPPER SHEETS

See Sheets, Copper

COPPER TUBE FITTINGS

See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED

See Fittings, Copper Tube, Flared

COPPER TUBING

See Tubing, Brass and Copper

CORROSION PREVENTIVES

See Devices, Electrolytic, for Preventing Corrosion; Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST

Bausch & Lomb Optical Co., Rochester, N. Y.
Hill, E. Vernon, Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Service to Industry, West Hartford, Conn.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
American Flexible Coupling Co., Erie, Pa.
Automatic Steel Products Inc., Canton, O. (automatic centrifugal clutch)
Blood Brothers Machine Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Brooks Equipment Corp., Hoboken, N. J.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Certified Flexible Couplings, New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Continental Diamond Fibre Co., Newark, Del.
Crocker-Wheeler Electric Mfg. Co. Div., Joshua Hendy Iron Works, Ampere, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Guardian Products Corp., Michigan City, Ind.
Irving Flexible Coupling Co., Los Angeles, Calif.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Koppers Co., Inc., Bartlett Hayward Div., Baltimore, Md.
Link-Belt Co., Indianapolis, Ind.
● Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Smith Corp., Winfield H., Springfield, Erie County, N. Y.
Sprout, Waldron & Co., Muncy, Pa.
Stow Mfg. Co., Binghamton, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Waldron Corp., John, New Brunswick, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitney Chain & Mfg. Co., The, Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

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COUPLINGS, PIPE

Aeroquip Corp., Jackson, Mich.
Alabama Pipe Co., Anniston, Ala. (Cast iron)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chase Brass & Copper Co., Waterbury, Conn.
Champion Machine & Forging Co., Cleveland, O.
Clow & Sons, James B., Chicago, Ill.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Drinkwater, Inc., Waukegan, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Hinderliter Tool Co., The. Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Mueller Brass Co., Port Huron, Mich.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Trenton, N. J. (Hard rubber)
Superior Railway Products Corp., Pittsburgh, Pa.
Union Metal Works, Chelsea, Mass.
United States Stoneware Co., New York, N. Y.
Victaulic Co. of America, New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wheeling Machine Products Co., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE

Aeroquip Corp., Jackson, Mich.
Drinkwater, Inc., Waukegan, Ill.
Gates Engineering Co., Wilmington, Del.
Hinderliter Tool Co., The, Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Packless Metal Products Corp., New Rochelle, N. Y.
Roylyn, Inc., Glendale, Calif.
Victaulic Co. of America, New York, N. Y.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

CRANE CAB COOLERS

See Coolers, Crane Cab

CUT-OFFS, LOW WATER, HEATING BOILER

B/W Controller Corp., Birmingham, Mich.
● Combustion Control Corp., Cambridge, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Controls Co., Glendale, Calif.
Johnson Corp., The, Three Rivers, Mich.
Magnetrol, Inc., Chicago, Ill.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.

CUTTERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Atkins & Co., E. C., Indianapolis, Ind.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Otto, Rochester, N. Y.
C-B Tool Co., Lancaster, Pa.
Continental Machine Co., Chicago, Ill.
Crown Die & Tool Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Everhot Products Co., Chicago, Ill.
Hollands Mfg. Co., Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machine Wks., Chicago, Ill.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
V-Mac Industries, Guilford, Conn.

CUTTERS, TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Otto, Rochester, N. Y.
Bonney Forge & Tool Works, Allentown, Pa.
Continental Machine Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Nye Tool Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Weatherhead Co., Cleveland, O.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DUCT, MANUALLY OPERATED

Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
● Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
● Air Devices, Inc., New York, N. Y.
Airecon Industries, Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Corbman Bros., Inc., Philadelphia, Pa.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Hart & Cooley Mfg. Co., Holland, Mich.
Inland Steel Products Co., Milwaukee, Wis.
Jacobs Co., B. & J., Cincinnati, O.
Kerentoff, G. L., Cincinnati, O.
Martens & Stormoen, Boston, Mass.
Meyer Mfg. Co., Detroit, Mich.
Ohio Products Co., Cleveland, O.
Salina Metal Products Co., Salina, Kan.
Sioux Steel Co., Sioux Falls, S. D.
Standard Furnace & Supply Co., Omaha, Neb.
Thermix Corp., The, Greenwich, Conn.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

● Air Conditioning Products Co., Detr[illegible] Mich.
Airecon Industries, Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
● Anemostat Corp. of America, New York, N. Y.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
● Johnson Service Co., Milwaukee, Wis.
Meyer Mfg. Co., Detroit, Mich.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.
● Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Heating Corp., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DAMPERS, PULSATION, FOR PIPING SYSTEMS

Campbell Co., J. A., Long Beach, Calif.
Taylor Instrument Companies, Rochester, N. Y.

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DEAERATORS

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Heat Transfer Products, Inc., Carbondale, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Liquid Conditioning Corp., Linden, N. J.
Permutit Co., New York, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Whitlock Mfg. Co., Hartford, Conn.
● Worthington Pump & Machinery Corp., Harrison, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

● Air & Refrigeration Corp., New York, N. Y.
Aqua-Sorb Co., East Orange, N. J.
Bryant Heater Co., Cleveland, O.
Carbide and Carbon Chemicals Corp., New York, N. Y. (Triethylene Glycol)
Cargocaire Engineering Corp., New York, N. Y. (for ships)
● Carrier Corp., Syracuse, N. Y.
Davison Chemical Corp., The, Baltimore, Md.
Dow Chemical Co., The, Midland, Mich.
Dry Air Product. Corp., Washington, D. C.
Drying Systems, Inc., Chicago, Ill.
Dryomatic Corp. of America, Baltimore, Md.
Floridin Co., Warren, Pa.
Kaufman Co., H. J., Detroit, Mich.
Morf Industries, Inc., Staten Island, N. Y.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rogers Air Conditioning Div., New York, N. Y. (Triethylene glycol)
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Solvay Sales Corp., New York, N. Y.
Somers, Inc., Detroit, Mich.
● Surface Combustion Corp., Toledo, O.
Tamms Silica Co., Chicago, Ill.

DEHUMIDIFYING UNITS

See Units, Air Conditioning; Dehumidifiers, Absorption and Adsorption

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

Davison Chemical Corp., The, Baltimore, Md.
Highside Chemicals Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Weatherhead Co., Cleveland, O.

DEHYDRATORS, REFRIGERANT

Aluminum Co. of America, Pittsburgh, Pa.
Aminco Refrigeration Products Co., Detroit, Mich.
● Automatic Products Co., Milwaukee, Wis.
Davison Chemical Corp., The, Baltimore, Md.
Electrimatic, Chicago, Ill.
Floridin Co., Warren, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Joliet Chemicals, Inc., Joliet, Ill.
McIntire Connector Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.
● Sporlan Valve Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.
Western Thermal Equipment Co., Los Angeles, Calif.

DESTROYERS, SOOT, CHEMICAL

Ampion Corp., Long Island City, N. Y.
Coughlan Co., G. N., West Orange, N. J.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
National Aluminate Corp., Chicago, Ill.
Nutmeg Chemical Co., New Haven, Conn.
O'Brien Industries, Jersey City, N. J.
Perolin Co., Inc., Chicago, Ill.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Tamms Silica Co., Chicago, Ill.
Vinco Co., Inc., The, New York, N. Y.
Western Chemical Co., Kansas City, Mo.

DESUPERHEATERS, STEAM

Babcock & Wilcox Co., New York, N. Y.
Brown Fintube Co., The, Elyria, O.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Foster Wheeler Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Northern Equipment Co., Erie, Pa.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
● Whitlock Mfg. Co., Hartford, Conn.

DETECTORS, LEAK, REFRIGERANT

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Globe Phone Mfg. Co., Boston, Mass.
Goss Gas Products Co., Pittsburgh, Pa.
Highside Chemicals Co., Newark, N. J.
Justrite Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Turner Brass Wks, Sycamore, Ill.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
Western Thermal Equipment Co., Los Angeles, Calif.

DEVICES, ELECTROLYTIC, FOR PREVENTING CORROSION

● Apex Engineering Co., Chicago, Ill.
● Brown-Electro Co., Oklahoma City, Okla.
McRay Products Co., Pasadena, Calif.
Rotometals, Inc., San Francisco, Calif.

DEW POINT INDICATORS

See Indicators, Dew Point

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR, HIGH VELOCITY

See also Grilles; Panels, Perforated, for Air Diffusion; Registers

A-J Mfg. Co., Kansas City, Mo.
● Air Devices, Inc., New York, N. Y.
● Aladdin Heating Corp., Oakland, Calif.
● Anemostat Corp. of America, New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
● Connor Engineering Corp., W. B., New York, N. Y.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
● Titus Mfg. Corp., Waterloo, Ia.
● Tuttle & Bailey, Inc., New Britain, Conn.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, WATER, FOR CONDENSERS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Martocello & Co., Jos. A., Philadelphia, Pa.
York Corp., York, Pa.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

Adams Co., The, Dubuque, Ia.
American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
● Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Camloc Fastener Corp., New York, N. Y. (Fasteners for)
● Clarage Fan Co., Kalamazoo, Mich.
Decatur Iron & Steel Co., Decatur, Ala.
Falstrom Co., Passaic, N. J.
Inland Steel Products Co., Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lockjoint Wood Products Co., Wichita, Kan.
Lumm Co., A. H., Toledo, O.
Rock Island Register Co., Rock Island, Ill.
Technical Ply-Woods, Chicago, Ill.
Truscon Steel Co., Youngstown, O.
Walsh Co., L. M., The, Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)

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DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRIERS

See Dehydrators, Refrigerant

DRILLS, ELECTRIC AND PNEUMATIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
● Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clark Electric Co., Jas., Jr., Louisville, Ky.
Duro Metal Products Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
● Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Keller Tool Co., Grand Haven, Mich.
Lee Co., K. O., Aberdeen, S. D.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Paramount Products Co., New York, N. Y.
Portable Electric Tools, Inc., Chicago, Ill.
Signal Electric Mfg. Co., Menominee, Mich.
Skilsaw, Inc., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
Willy's Carbide Tool Co., Detroit, Mich.
Wodack Electric Tool Corp., Chicago, Ill.

DRILLS, POWDER OPERATED

Mine Safety Appliances Co., Pittsburgh, Pa. (drives studs for pipe hangers, etc. into concrete)
Tempo Products Co., Cleveland, O.

DRIVES, CHAIN

Caldwell Co., W. E., Louisville, Ky.
Chain Belt Co., Milwaukee, Wis.
CraneVeyor Corp., Los Angeles, Calif.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Horton Mfg. Co., Minneapolis, Minn.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
Ramsey Chain Co., Inc., Albany, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Whitney Chain & Mfg. Co., The, Hartford, Conn.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, V BELT

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Continental Rubber Wks, Erie, Pa.
● Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Salsbury Motors, Inc., Pomona, Calif.
Thermoid Co., Trenton, N. J.
V-Belt Clutch Co., Los Angeles, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
● Worthington Pump & Machinery Corp., Harrison, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Bowen Engineering Corp., Garwood, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Despatch Oven Co., Minneapolis, Minn.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Hersey Mfg. Co., South Boston, Mass.
Instant Drying Corp., New York, N. Y.
● Jackson & Church Co., Saginaw, Mich. (Dryer for corn, grain, hops, and wood)
Kirk & Blum Mfg. Co., Cincinnati, O.
Link-Belt Co., Indianapolis, Ind.
Louisville Drying Machinery Div., General American Transportation Corp., Louisville, Ky.
Peters-Dalton, Inc., Detroit, Mich.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Raymond Pulverizer Div., Combustion Engineering Co., Chicago, Ill.
Ross Engineering Corp., J. O., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Stokes Machine Co., F. J., Philadelphia, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Precipitation Corp., Los Angeles, Calif.

DRYERS, REFRIGERANT

See Dehydrators, Refrigerant

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT FURNACES

See Furnaces, Duct

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, METALLIC

Acer & Whedon, Inc., Medina, N. Y.
Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
American Ventilating Hose Co., New York, N. Y.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago, Ill.
● Chicago Metal Hose Corp., Maywood, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Corbman Bros., Inc., Philadelphia, Pa.
Excelsior Steel Furnace Co., Chicago, Ill.
General Corporation, Minneapolis, Minn.

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Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Gray Metal Products, Inc., Rochester, N. Y.
Henry Furnace Co., The, Medina, O.
Howes-Woods Co., Cambridge, Mass.
Inland Steel Products Co., Milwaukee, Wis.
International Heater Co., Utica, N. Y.
Jacobs Co., B. & J., Cincinnati, O.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., & Columbus, O.
Littleford Bros., Inc., Cincinnati, O.
Meyer & Bro. Co., F., Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Schecter Brothers Co., Philadelphia, Pa.
Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Sioux Steel Co., Sioux Falls, S. D.
Smith-Raymond Co., Columbus, Ga.
Standard Furnace & Supply Co., Omaha, Neb.
United States Register Co., Battle Creek, Mich.
Van Noorden Co., E. Boston, Mass.
Viking Mfg. Corp., Cleveland, O.
Waverly Heating Supply Co., Boston, Mass.
Williamson Heater Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-METALLIC

Arrowhead Rubber Co., Los Angeles, Calif.
Carey, The Philip, Mfg. Co., Lockland, Cincinnati, O.
du Pont de Nemours & Co., E. I., Fabrics & Finishes Dept., Wilmington, Del.
Flexible Tubing Corp., Branford, Conn.
Haveg Corp., Newark, Del. (for fumes)
Jacobs Co., B. & J., Cincinnati, O.
Johns-Manville, New York, N. Y.
Knight, Maurice A., Akron, O. (acid fumes)
Smith-Raymond Co., Columbus, Ga.
United States Rubber Co., New York, N. Y.

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering Co., Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Foster Wheeler Corp., New York, N. Y.
Green Fuel Economizer Co., Beacon, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Springfield Boiler Co., Springfield, Ill.

EJECTORS, SEWAGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Economy Pumps, Inc., Hamilton, O.
● Nash Engineering Co., South Norwalk, Conn.
Penberthy Injector Co., Detroit, Mich.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Inc., Buffalo, N. Y.
● Weil Pump Co., Chicago, Ill.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Yeomans Bros. Co., Chicago, Ill.

ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

Kehm Corp., The, Chicago, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.

ELECTRIC AIR CLEANERS

See Cleaners, Air, Electrical

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRIC WATER HEATERS

See Heaters, Water, Electric

ELECTRODES, ARC WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Allied Weld-Craft, Inc., Indianapolis, Ind.
Aluminum Co. of America, Pittsburgh, Pa.
American Agile Corp., Cleveland, O.
American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
Arcos Corp., Philadelphia, Pa.
Carlin Co., Anthony, Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Electric Arc., Inc., Newark, N. J.
Eutectic Welding Alloys Corp., New York, N. Y.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
International Nickel Co., Inc., The, New York, N. Y.
Jessop Steel Co., Washington, Pa.
Laclede Steel Co., St. Louis, Mo.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., New York, N. Y.
National Carbon Co., New York, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Sight Feed Generator Co., Richmond, Ind.
Smith Corp., A. O., Milwaukee, Wis.
Trindl Products, Ltd., Chicago, Ill.
Universal Power Corp., Cleveland, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Welder & Metals Co., Inc., New York, N. Y.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Works, Three Rivers, Mich.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
● Dole Valve Co., The, Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Livingstone Engineering Co., Worcester, Mass.
Lodge & Shipley Machine Tool Co., Cincinnati, O.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
● Sterling, Inc., Milwaukee, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Specialty Co., New York, N. Y.
Wright-Austin Co., Detroit, Mich.

ENAMELS AND LACQUERS

Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
American-Marietta Co., Chicago, Ill.
Arco Co., Cleveland, O.
Atlas Powder Co., North Chicago, Ill.
Baer Bros., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Claronex Products, Inc., Brooklyn, N. Y.
Cordo Chemical Co., Norwalk, Conn.
Debevoise Co., The, Brooklyn, N. Y.
Devoe & Raynolds Co., Inc., New York, N. Y.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Hague & Co., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Irvington Varnish and Insulator Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Midwest Products Co., Port Byron, Ill.
O'Brien Corp., The, South Bend, Ind.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.

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Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Thompson & Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
U. S. Gutta Percha Paint Co., Providence, R. I.
United Chromium, Inc., New York, N. Y.
Wilbur & Williams Co., Boston, Mass.
Wilhelm Co., A., Reading, Pa.

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

American Locomotive Co., Auburn, N. Y.
Anderson Diesel Engine Co., Philadelphia, Pa.
Baldwin De La Vergne Sales Corp., Philadelphia, Pa.
Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Muskegon, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.
Fairbanks, Morse & Co., Chicago, Ill.
Hill Diesel Engine Div. of Indian Motocycle Co., Lansing, Mich.
● Ingersoll-Rand Co., New York, N. Y.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., Kansas City, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Detroit, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Chicago, Ill.
● Ingersoll-Rand Co., New York, N. Y.
Salsbury Motors, Inc., Pomona, Calif.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., Kansas City, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

● Ames Iron Wks., Div. of Pierce, Butler Radiator Corp., Oswego, N. Y.
Harrisburg Machinery Corp., Harrisburg, Pa.
Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

EQUIPMENT, BALANCING

● Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Gisholt Machine Co., Madison, Wis.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

EXCHANGERS, HEAT

● Aerofin Corp., Syracuse, N. Y.
Airecon Industries, Detroit, Mich.
Aluminum Co. of America, Pittsburgh, Pa.
American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Babcock & Wilcox Co., New York, N. Y.
● Baker Ice Machine Co., Inc., South Windham, Me.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Brown Fintube Co., The, Elyria, O.
● Brownell Co., Dayton, O.
Buffalo Tank Corp., Dunellen, N. J.
● Bush Mfg. Co., West Hartford, Conn.
Champion Unit Heater Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Eastern Industries, Inc., New Haven, Conn.
Farrar & Trefts, Buffalo, N. Y.
Foster Wheeler Corp., New York, N. Y.
General Ceramics & Steatite Corp., Keasbey, N. J. (Imperrious Graphite)
Goodyer Industries, Inc., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Griscom-Russell Co., The, New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Kellogg Co., M. W., The, New York, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Larkin Coils, Atlanta, Ga.
● McQuay, Inc., Minneapolis, Minn.
Minimite Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
Mueller Brass Co., Port Huron, Mich.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Carbon Co., New York, N. Y.
National Pipe Bending Co., New Haven, Conn.
● National Radiator Co., The, Johnstown, Pa.
Nooter Boiler Works Co., John, St. Louis, Mo.
Parker Appliance Co., The, Cleveland, O.
● Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Peerless of America, Inc., Chicago, Ill.
Perfex Corp., Milwaukee, Wis.
● Prat-Daniel Corp., East Port Chester, Conn.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Quaker City Iron Works, Philadelphia, Pa.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Stout & Sons, David, St. Louis, Mo.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taco Heaters, Inc., Providence, R. I.
Thermal Industries, Indio, Calif.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Mmneapolis, Minn.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vapor Heating Corp., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Whitlock Mfg. Co., Hartford, Conn.
Wilson Engineering Corp., Chicago, Ill.
● Worthington Pump & Machinery Corp., Harrison, N. J.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

● Acme Industries, Inc., Jackson, Mich.
Betz Corp, Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Gerstein & Cooper Co., Somerville, Mass.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Kaiser Co., E. B., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Remco, Inc., Zelienople, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass
Temprite Products Corp., Detroit, Mich.
Wabash Mfg. Co., Chicago, Ill.
● Young Radiator Co., Racine, Wis.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUSTERS, WELDING FUME

● Aladdin Heating Corp., Oakland, Calif.
● American Blower Corp., Detroit, Mich.
American Machine Products Co., Marshalltown, Ia.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Chicago Blower Corp., Chicago, Ill.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Day Co., The, Minneapolis, Minn.
● General Blower Co., Morton Grove, Ill.
Jenn Air Products Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
Peters-Dalton, Inc., Detroit, Mich.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Ruemelin Mfg. Co., Milwaukee, Wis.
Torit Mfg. Co., St. Paul, Minn.

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● Utility Appliance Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Wind-Way Fan & Ventilator Co., New Orleans, La.

EXPANDERS, BOILER TUBE

Dudgeon, Inc., Richard, New York, N. Y.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe, Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

EXTRACTORS, PIPE

Reps Tool Co., Inc., Hartford Conn.
● Ridge Tool Co., Elyria, O.

FABRICATED PIPING

See Bends; Headers; Joints, etc.

FABRICATORS, PIPE

See Headers, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN HOUSINGS

See Housings, Fan, Centrifugal

FANS, AXIAL FLOW, PRESSURE TYPE

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O. (Tubeaxial)
● American Blower Corp., Detroit, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
Chicago Blower Corp., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y. (vaneaxial)
● De Bothzat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering Inc., Dayton, O.
● Joy Mfg. Co., Pittsburgh, Pa. (vaneaxial)
● Moore Co., The, Kansas City, Mo. (vaneaxial)
Propellair Div., Robbins & Myers Inc., Springfield, O.
● South Bend Air Products, Inc., South Bend, Ind.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Advance Fan & Blower Co., Detroit, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
● Aladdin Heating Corp., Oakland, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
● American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Machine Products Co., Marshalltown, Ia.
Bayley Blower Co., Milwaukee, Wis.
Bern's Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., The, Kalamazoo, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Chicago, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Despatch Oven Co., Minneapolis, Minn.
Dual-Air Fan Co., South Elgin, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Essick Mfg. Co., Los Angeles, Calif.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
● General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Products Co., Phoenix, Ariz.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Green Fuel Economizer Co., Beacon, N. Y.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Company, Indianapolis, Ind.
International Sales Co., San Francisco, Calif.
● Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Hastings, Neb.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
Johnson Fan & Blower Corp., Chicago, Ill.
● King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa.
Lienweber Propellers, Chicago, Ill.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Wks., Portland, Ore.
Morrison Products, Inc., Cleveland, O.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
National Mfg. & Engineering Co., Detroit, Mich.
Nelson Corp., Herman, Moline, Ill.
● New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Northwest Foundry & Furnace Co., Portland, Ore.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
● Prat-Daniel Corp., East Port Chester, Conn.
Reynolds Mfg. Co., The, Grand Rapids, Mich.
Redmond Co., Inc., Owosso, Mich.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Schwitzer-Cummins Co., Indianapolis, Ind.
Semco Mfg. Co., Nashville, Tenn.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sprout-Waldron & Co., Muncy, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, PROPELLER

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Air Equipment Co., Chicago, Ill.
Airecon Industries, Detroit, Mich.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
● American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American Metal Products Co., Fort Worth, Tex.
Arex Co., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Bayley Blower Co., Milwaukee, Wis.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Mfg. Co., Chicago, Ill.
Binks Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Broan Mfg. Co., Inc., Milwaukee, Wis.
Bronson Fan Mfg. Co., Los Angeles, Calif.
● Buffalo Forge Co., Buffalo, N. Y.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Campbell Heating Co., E. K., Kansas City, Mo.
Carling Turbine Blower Co., Worcester, Mass.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Chicago, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.

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Dana Fan & Blower Corp., Cincinnati, O.
● De Bothzat Fans Div., American Machine & Metals, Inc., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Diehl Mfg. Co., Somerville, N. J.
Dual-Air Fan Co., South Elgin, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Essick Mfg. Co., Los Angeles, Calif.
FASCO Industries, Inc., Rochester, N. Y.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
● General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Guth Co., Edwin F., St. Louis, Mo.
Hartzell Propeller Fan Co., Piqua, O.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Holtum Mfg. Co., Freeport, Ill.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Co., Indianapolis, Ind.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Joy Mfg. Co., Pittsburgh, Pa.
Kernchen Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lau Blower Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Martin Fan & Blower Co., Chicago, Ill.
● McCord Corp., Detroit, Mich.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
● Moore Co., The, Kansas City, Mo.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Nelson Corp., Herman, Moline, Ill.
● New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O. (Disc)
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
● Pritchard & Co., J. F., Kansas City, Mo.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Semco Mfg. Co., Nashville, Tenn.
Sensenich Corp., Lancaster, Pa.
Signal Electric Mfg. Co., Menominee, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Somers, Inc., H. J., Detroit, Mich.
● South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Sutton Corp., O. A., Wichita, Kan.
Swift Mfg. Co., Inc., Detroit, Mich.
Thermal Industries, Indio, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Wind-Way Fan & Ventilating Co., New Orleans, La.
● Wing Mfg. Co., L. J., New York, N. Y.

FASTENERS, INSULATION

Devices, Inc., New York, N. Y.
● Lexington Supply Co., Cleveland, O.
Meco, Inc., Portland, Ore.
● Stic-Klip Mfg. Co., Cambridge, Mass.
Tinnerman Products, Inc., Cleveland, O.

FEEDERS, CHEMICAL, PROPORTIONING

American Water Softener Co., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bogue Electric Co., Paterson, N. J.
Elgin Softener Corp., Elgin, Ill.
Fuller Co., Catasauqua, Pa.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haering & Co., Inc., D. W., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, O.
National Aluminate Corp., Chicago, Ill.
% Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Roy Co., Milton, Philadelphia, Pa.
Sprout, Waldron & Co., Muncy, Pa.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Syntron Co., Homer City, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

FEEDERS, WATER, HEATING BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Campbell Co., J. A., Long Beach, Calif.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Controls Co., Glendale, Cal.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Templeton Bros., Hyde Park, Mass.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.

FEEDWATER HEATERS

See Deaerators

FIBER PACKING

See Packing, Fiber

FIBER PIPE

See Pipe, Fiber

FILTER GAGES

See Gages, Air Filter

FILTERS, AIR, AUTOMATIC

Air-Stream Filter Corp., St. Louis, Mo.
● American Air Filter Co., Inc., Louisville, Ky.
● Continental Air Filters, Inc., Louisville, Ky.
● Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
National Air Conditioning Inc., Johnstown, Pa.
Ruemelin Mfg. Co., Milwaukee, Wis.

FILTERS, AIR, ELECTRIC

See Cleaners, Air, Electrical

FILTERS, AIR, GREASE

● Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
● American Air Filter Co., Inc., Louisville, Ky.
● Continental Air Filters, Inc., Louisville, Ky.
● Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
Filtair Mfg. Co., San Francisco, Calif.
● Research Products Corp., Madison, Wis.

FILTERS, AIR, UNIT, CLEANABLE

● Air Devices, Inc., New York, N. Y.
● Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
● American Air Filter Co., Inc., Louisville, Ky.
Chicago Filter Co., Joliet, Ill.
● Continental Air Filters, Inc., Louisville, Ky.
Coppus Engineering Corp., Worcester, Mass.
● Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Research Products Corp., Madison, Wis.
Somers, Inc., H. J., Detroit, Mich.
Supreme Air Filter Co., New York, N. Y.
Universal Air Filter Corp., Duluth, Minn.

FILTERS, AIR, UNIT, THROW-AWAY

● Air Devices, Inc., New York, N. Y.
● American Air Filter Co., Inc., Louisville, Ky.

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- Blocksom & Co., Michigan City, Ind.
- Chicago Filter Co., Joliet, Ill.
- Drico Industrial Corp., New York, N. Y.
- Morf Industries, Inc., Staten Island, N. Y.
- ● Owens-Corning Fiberglas Corp., Toledo, O.
- ● Research Products Corp., Madison, Wis.
- Smith Co., O. F., Moline, Ill.
- Universal Air Filter Corp., Duluth, Minn.
- ● Wilson & Co., Inc., Chicago, Ill.

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

- Adams Co., Inc., R. P., Buffalo, N. Y.
- Air-Maze Corp., Cleveland, O.
- ● Alco Valve Co., St. Louis, Mo.
- ● American Air Filter Co., Inc., Louisville, Ky.
- American Cyanamid & Chemical Corp., New York, N. Y.
- American Locomotive Co., Alco Products Div., New York, N. Y.
- Andale Co., Philadelphia, Pa.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Bowser, Inc., Fort Wayne, Ind.
- CCA Products, Inc., Glendale, Calif.
- Cleveland Humidifier Co., Cleveland, O.
- Commercial Filters Corp., Boston, Mass.
- Cuno Engineering Corp., Meriden, Conn.
- DeVilbiss Co., The, Toledo, O.
- ● Dollinger Corp., Rochester, N. Y.
- Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
- Fisher Governor Co., Marshalltown, Ia.
- Fram Corp., Providence, R. I. (fuel oil)
- Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
- General Filters, Inc., Detroit, Mich. (fuel oil)
- Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
- Hotstream Heater Co., Cleveland, O. (air)
- Johnson Corp., The, Three Rivers, Mich.
- Kaye & MacDonald, Inc., West Orange, N. J.
- Kraissl Co., Inc., The, Hackensack, N. J.
- Logan Engineering Co., Chicago, Ill.
- Mason-Neilan Regulator Co., Boston, Mass.
- Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
- Morse-Smith-Morse, Inc., Watertown, Mass.
- Newark Wire Cloth Co., Newark, N. J.
- Norgren Co., C. A., Denver, Colo.
- Patrol Valve Co., The Cleveland, O.
- Permutit Co., New York, N. Y.
- Refinite Corp., Omaha, Neb.
- Rega Mfg. Co., Rochester, N. Y.
- Rodwell Engineering & Sales Co., Omaha, Neb.
- Scientific Instrument Co., Detroit, Mich.
- Standard Machine & Mfg. Co., St. Louis, Mo.
- Trerice Co., Detroit, Mich.
- W. G. B. Oil Clarifier, Inc., Kingston, N. Y.
- Weatherhead Co., Cleveland, O.
- Winslow Engineering Co., Oakland, Calif.
- ● Worthington Pump & Machinery Corp., Harrison, N. J.

FILTERS, REFRIGERANT

- ● Alco Valve Co., St. Louis, Mo.
- ● Automatic Products Co., Milwaukee, Wis.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Commercial Filters Corp., Boston, Mass.
- ● Henry Valve Co., Chicago, Ill.
- Imperial Brass Mfg. Co., Chicago, Ill.
- McIntire Connector Co., Newark, N. J.
- Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
- Mueller Brass Co., Port Huron, Mich.
- Newark Wire Cloth Co., Newark, N. J.
- Phillips & Co., H. A., Chicago, Ill.
- Remco, Inc., Zelienople, Pa.
- ● Sporlan Valve Co., St. Louis, Mo.
- Standard Machine & Mfg. Co., St. Louis, Mo.
- Wabash Mfg. Co., Chicago, Ill.
- Weatherhead Co., Cleveland, O.

FILTERS, WATER

- Adams Co., Inc., R. P., Buffalo, N. Y.
- ● Alco Valve Co., St. Louis, Mo.
- American Cyanamid & Chemical Corp., New York, N. Y.
- American Water Softener Co., Philadelphia, Pa.
- American Well Works, Aurora, Ill.
- Aqua-Mist Co., Topeka, Kan. (Aspenwood fibre)
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Bowser, Inc., Fort Wayne, Ind.
- Cochrane Corp., Philadelphia, Pa.
- Commercial Filters Corp., Boston, Mass.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Cuno Engineering Corp., Meriden, Conn.
- ● Dollinger Corp., Rochester, N. Y.
- Duro Co., Dayton, O.
- Elgin Softener Corp., Elgin, Ill.
- Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
- Greer Hydraulics, Inc., Brooklyn, N. Y.
- Kaye & MacDonald, Inc., West Orange, N. J.
- Liquid Conditioning Corp., Linden, N. J.
- Newark Wire Cloth Co., Newark, N. J.
- Norwood Filtration Co., The, Holyoke, Mass.
- % Proportioneers, Inc. %, Providence, R. I.
- Permutit Co., New York, N. Y.
- Red Jacket Mfg. Co., Davenport, Ia.
- Refinite Corp., Omaha, Neb.
- Valley Foundry & Machine Works, Inc., Fresno, Calif.
- Winslow Engineering Co., Oakland, Calif.
- ● Worthington Pump & Machinery Corp., Harrison, N. J.

FINNED TUBING

See Tubing, Finned

FIRE PUMPS

See Pumps, Fire

FITTINGS, BLOW PIPE

- Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Allington & Curtis Mfg. Co., Saginaw, Mich.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Day Co., The, Minneapolis, Minn.
- Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
- Gustin Bacon Mfg. Co., Kansas City, Mo.
- Kirk & Blum Mfg. Co., Cincinnati, O.
- Mahon Co., R. C., Detroit, Mich.
- ● National Metal Fabricators, Chicago, Ill.
- Newcomb-Detroit Co., Detroit, Mich.
- Northern Blower Co., Cleveland, O.
- Peters-Dalton, Inc., Detroit, Mich.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Schmieg Inudustries, Detroit, Mich.
- ● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
- ● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
- Tiffin Eaves Trough Clamp Co., Tiffin, O.
- United States Register Co., Battle Creek, Mich.
- Western Blower Co., Seattle, Wash.
- Winkler & Sons, Inc., A. E., Milwaukee, Wis.
- Young & Bertke Co., Cincinnati, O.

FITTINGS, COPPER TUBE, COMPRESSION

- American Brass Co., Waterbury, Conn.
- Chase Brass & Copper Co., Waterbury, Conn.
- Commonwealth Brass Corp., Detroit, Mich.
- ● Dole Valve Co., The, Chicago, Ill.
- Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
- Everhot Products Co., Chicago, Ill.
- ● Grinnell Co., Inc., Providence, R. I.
- Hays Mfg. Co., Erie, Pa.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Parker Appliance Co., The, Cleveland, O.
- Petroleum Equipment Mfg. Co., New Haven, Conn.
- Wabash Mfg. Co., Chicago, Ill.
- Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, FLARED

- Acheson Mfg. Co., Rankin, Pa.
- American Brass Co., Waterbury, Conn.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chase Brass & Copper Co., Waterbury, Conn.
- Commonwealth Brass Corp., Detroit, Mich.
- ● Dole Valve Co., The, Chicago, Ill.
- Everhot Products Co., Chicago, Ill.
- ● Grinnell Co., Inc., Providence, R. I.
- Hays Mfg. Co., Erie, Pa.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Mueller Brass Co., Port Huron, Mich.
- Northern Indiana Brass Co., Elkhart, Ind.
- Packless Metal Products Corp., New Rochelle, N. Y.
- Parker Appliance Co., The, Cleveland, O.
- Petroleum Equipment Mfg. Co., New Haven, Conn.
- Phoenix Brass Fittings Corp., Irvington, N. J.
- ● Scovill Mfg. Co., Waterbury, Conn.
- Truetite Corp., The, Bridgeport, Conn.
- Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, SOLDER

- Acheson Mfg. Co., Rankin, Pa.
- American Brass Co., Waterbury, Conn.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chase Brass & Copper Co., Waterbury, Conn.
- Commonwealth Brass Corp., Detroit, Mich.
- ● Crane Co., Chicago, Ill.
- Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
- Grabler Mfg. Co., Cleveland, O.
- ● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
- Mueller Brass Co., Port Huron, Mich.
- Northern Indiana Brass Co., Elkhart, Ind.

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Phoenix Brass Fittings Corp., Irvington, N. J.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y. (Brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

American Sterilizer Co., Erie, Pa.
● Crane Co., Chicago, Ill.
Ohio Chemical & Mfg. Co., The, Madison, Wis.
Semler Co., Jeannette, Pa.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

Autostributor Co., Lansing, Mich. (manifold for connecting radiator branches)
● Bell & Gossett Co., Morton Grove, Ill.
Kehm Corp., The, Chicago, Ill.
Mel Products Co., The, New Haven, Conn.
Sall Bros. Co., Rockford, Ill.
Semler Co., Jeannette, Pa.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
● Tube Turns, Inc., Louisville, Ky.
W-H Engineering Co., Chicago, Ill.

FITTINGS, LINED

American Hard Rubber Co., New York, N. Y. (Rubber)
Cement Lined Pipe Co., Lynn, Mass. (Lead and tin)
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass.
United States Rubber Co., New York, N. Y. (Rubber)
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
American Manganese Bronze Co., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Leavitt Machine Co., Orange, Mass.
Lunkenheimer Co., Cincinnati, O.
New York Brass Fdry., New York, N. Y.
Parker Appliance Co., Cleveland, O.
Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
U. S. Plug & Fitting Co., Cleveland, O. (pipe plugs)
Union Metal Wks., Chelsea, Mass.
● Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRASS, WELDING

Bonney Forge & Tool Wks., Allentown, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York., N. Y. (Brazed)

FITTINGS, PIPE, BRONZE, BRAZED

Chase Brass & Copper Co., Waterbury, Conn.
Fairbanks Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRONZE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Everhot Products Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Parker Appliance Co., Cleveland, O.
Union Metal Works, Chelsea, Mass.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
● Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
Malleable Iron Fittings Co., Branford, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
United States Pipe & Foundry Co., Burlington, N. J.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, CAST IRON, THREADED

Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Somerville Iron Works, Somerville, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Plug & Fitting Co., Cleveland, O. (pipe plugs)
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, COMPRESSION

Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hays Mfg. Co., Erie, Pa.
Patrol Valve Co., The, Cleveland, O.

FITTINGS, PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J.
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Trenton, N. J.
United States Rubber Co., New York, N. Y.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
Patrol Valve Co., The, Cleveland, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.

FITTINGS, PIPE, MALLEABLE

Corley Co., Inc., The, Jersey City, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

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FITTINGS, PIPE, MALLEABLE, BRAZED

Flagg & Co., Inc., Stanley G., Philadelphia, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

Alloy Steel Products Co., Linden, N. J.
American Manganese Bronze Co., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
● Ladish Co., Cudahy, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
Amerform Corp., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Haveg Corp., Newark, Del.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, STAINLESS STEEL

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
Flori Pipe Co., The, St. Louis, Mo.
Hasco Valve & Machine Co., Milwaukee, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, FLANGED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Kerotest Mfg. Co., Pittsburgh, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Semet-Solvay Engrg. Corp., New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, FORGED, THREADED

Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
● Henry Valve Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, SOCKET WELD

Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
DAS Div. of Defiance Automatic Screw Co., Defiance, O.
Flori Pipe Co., The, St. Louis, Mo.
● Ladish Co., Cudahy, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, THREADED

Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
DAS Div. of Defiance Automatic Screw Co., Defiance, O.
Flori Pipe Co., The, St. Louis, Mo.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
● Ladish Co., Cudahy, Wis.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Tubing Seal-Cap, Inc., Los Angeles, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Globe Steel Tubes Co., Milwaukee, Wis.
● Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
● Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, WROUGHT IRON, WELDING

Bonney Forge & Tool Works, Allentown, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
● Taylor Forge & Pipe Wks., Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.

FITTINGS, REFRIGERATION

Aeroquip Corp., Jackson, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
● Baker Ice Machine Co., Inc., South Windham, Me.
Byers Co., A. M., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Electrimatic, Chicago, Ill.
● Frick Co., Waynesboro, Pa.
Hays Mfg. Co., Erie, Pa.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Ladish Co., Cudahy, Wis.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wittenmeier Machinery Co., Chicago, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Inc., Chicago, Ill.
York Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.

FLAME CONTROLS

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FLANGE BOLTS

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FLANGES, ORIFICE

Barton Instrument Co., Los Angeles, Calif.
Buliders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Conoflow Corp., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Ladish Co., Cudahy, Wis.
Meriam Instrument Co., The, Cleveland, O.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Trimount Instrument Co., Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FLANGES, PIPE, ALLOY STEEL, WELDING

Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennslvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conoflow Corp., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Providence, R. I.
● Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
● Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Warren Foundry & Pipe Corp., New York, N. Y.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

● Baker Ice Machine Co., Inc., South Windham, Me.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., Hillside, N. J.
Flori Pipe Co., The, St. Louis, Mo.
● Ladish Co., Cudahy, Wis.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FLANGES, PIPE, STEEL, LAP JOINT

● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Chicago Metal Mfg. Co., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
● Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, SCREWED

● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

FLANGES, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Flori Pipe Co., The, St. Louis, Mo.

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● Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

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FLEXIBLE DUCT CONNECTIONS

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FLEXIBLE METAL HOSE

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FLOAT SWITCHES

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FLOAT VALVES

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FLOATS, STEAM TRAP, ETC.

Bailey Co., Chas. M., San Francisco, Calif.
Chicago Float Works, Inc., Chicago, Ill.
Clark Controller Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Harris & Co., Arthur, Chicago, Ill.
Hercules Float Wks., Springfield, Mass.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Kieley & Mueller, Inc., North Bergen, N. J.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Naugatuck Mfg. Co., Union City, Conn.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Reichert Float & Mfg. Co., Toledo, O.
Reliance Gauge Column Co., Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
● Swartwout Co., Cleveland, O.
● Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., The, Pittsburgh, Pa.

FLOOR AND CEILING PLATES

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FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING HEATING

● Airtherm Mfg. Co., St. Louis, Mo.
● Aladdin Heating Corp., Oakland, Calif.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland, O.
● Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Certified Furnace Co., Div. of Stainless & Steel Products Co., St. Paul, Minn.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
● Dravo Corp., Pittsburgh, Pa.
Gross-Aire Mfg. Co., Overland, Mo.
International Sales Co., San Francisco, Calif.
● Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Saugas, Mass.
Lee Engineering Co., Hoboken, N. J.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, O.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Majestic Co., Huntington, Ind.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Montag Stove & Furnace Wks., Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Naco Mfg. Co., Huntington Park, Calif.
National Heater Co., St. Paul, Minn.
National Mfg. & Engineering Co., Detroit, Mich.
Northwest Foundry & Furnace Co., Portland, Ore.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Co., Beverly Hills, Calif.
Perfection Stove Co., Cleveland, O.
● Prat-Daniel Corp., East Port Chester, Conn.
Rosebraugh Co., W. W., Salem, Ore.
Service Metal Fabricators, Inc., Chicago, Ill.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Smith Heater Co., Peter, Dearborn, Mich.
● Surface Combustion Corp., Toledo, O.
Syncromatic Corp., Watertown, Wis.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit, Mich.

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GAGES, AIR FILTER

Defender Instrument and Regulator Co., St. Louis, Mo.
● Dollinger Corp., Rochester, N. Y.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
● Hayes Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
● Research Products Corp., Madison, Wis.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cole-Sewell Engineering Co., St. Paul, Minn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.

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Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
General Blower Co., Inc., Philadelphia, Pa.
● Hays Corp., Michigan City, Ind.
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Moeller Instrument Co., Richmond Hill, N. Y.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE

Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Dole Valve Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Hill, E. Vernon, Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
● Mettler Co., Lee B., Los Angeles, Calif.
Mouat Vapor Heating Co., The, Cleveland, O.
Norgren Co., C. A., Denver, Colo.
Perfex Corp., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Chicago, Ill.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Watson-Stillman Co., Roselle, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, INDICATING, VACUUM

Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
● Dole Valve Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hayes Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Mouat Vapor Heating Co., The, Cleveland, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Stewart-Warner Corp., Chicago, Ill.
Stokes Machine Co., F. J., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wallace & Tiernan, Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Injector Co., Detroit, Mich.
Applied Mechanics Co., Boston, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bearlee Products Co., Green Bay, Wis.
Belfield Co., H., Philadelphia, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Caldwell Co., W. E., Louisville, Ky.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Detroit, Mich.
Ernst Water Column & Gage Co., Livingston, N. J.
Foxboro Co., Foxboro, Mass.
● Frick Co., Waynesboro, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
● Hays Corp., Michigan City, Ind.
● Henry Valve Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
King Engineering Corp., Ann Arbor, Mich.
Klingerite, Inc., New York, N. Y.
● Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidometer Corp., Long Island City, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
McAlear Mfg. Co., Chicago, Ill.
Mel-Gauge Co., East Haven, Conn.
Mel Products Co., The, New Haven, Conn.
Meriam Instrument Co., The, Cleveland, O.
● Mettler Co., Lee B., Los Angeles, Calif.
Moore Products Co., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Nason Co., Detroit, Mich.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Penberthy Injector Co., Detroit, Mich.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Petrometer Corp., Long Island City, N. Y.
Powell Co., Wm., Cincinnati, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Reliance Gauge Column Co., Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Chicago, Ill.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Viking Pump Co., Cedar Falls, Ia.
Wallace & Tiernan Co., Newark, N. J.
Williams Gauge Co., The, Pittsburgh, Pa. (Water)
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

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GASKETS

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill. (Felt, rubber)
Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O.
Alpha Metals, Inc., Brooklyn, N. Y.
American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
Armstrong Cork Co., Lancaster, Pa., (Cork & cork composition)
Austin-Mason Co., New York, N. Y.
Azor Corp., Irvington, N. J. (Spiral wound)
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Chase Brass & Copper Co., Waterbury, Conn. (Brass and copper)
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Continental Diamond Fibre Co., Newark, Del.
Continental Rubber Wks., Erie, Pa.
● Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa. (Paper, fibre)
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill. (Heat and oil resisting)
Felters Company, The, Boston, Mass.
Flexitallic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Akron, O.
● Frick Co., Waynesboro, Pa.
Garlock Packing Co., Palmyra, N. Y. (Rubber, asbestos, fibre, semi-metallic)
Gates Rubber Co., The, Denver, Colo.
Gatke Corp., Chicago, Ill.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass. (Leather)
Greene, Tweed & Co., North Wales, Pa.
Houghton & Co., E. F., Philadelphia, Pa. (Leather)
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Klingerit, Inc., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mitchell & Smith, Inc., Detroit, Mich. (Cork)
Mortell Co., J. W., Kankakee, Ill.
National Engineering Products, Inc., Washington, D. C. (Plastic)
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber and asbestos)
Resistoflex Corp., Belleville, N. J.
Schieren Co., Chas. A., New York, N. Y.
Sherwin-Williams Co., The, Cleveland, O.
Smooth-On Mfg. Co., Jersey City, N. J. (Corrugated iron)
Steel Improvement & Forge Co., Cleveland, O.
Stokes Molded Products, Trenton, N. J. (Hard rubber)
Technical Ply-Woods, Chicago, Ill.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y. (Rubber, asbestos)
United States Stoneware Co., New York, N. Y.
Vibration Engineering Co., The, New York, N. Y. (Cork)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Felt Wks., Chicago, Ill. (Felt)
● Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GATE VALVES

See Valves, Gate

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Berger Bros., Co., Philadelphia, Pa.
● Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
● Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Milwaukee, Wis.
Newcomb-Detroit Co., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Spencer Turbine Co., Hartford, Conn.
Thermix Corp., The, Greenwich, Conn.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE

See Pipe, Glass

GLASSES, GAGE

Bache, Semon & Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Corning Glass Works, Corning, N. Y.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Detroit, Mich.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
● Henry Valve Co., Chicago, Ill.
Klingerit, Inc., New York, N. Y.
Libbey-Owens-Ford Glass Co., Toledo, O.
Lunkenheimer Co., Cincinnati, O.
Powell Co., Wm., Cincinnati, O.
Swift Lubricator Co., Elmira, N. Y.

GLASSES, SIGHT, FOR PIPE LINES

American District Steam Co., North Tonawanda, N. Y.
Bowser, Inc., Fort Wayne, Ind.
Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa. (for refrigerant lines)
Schutte & Koerting Co., Philadelphia, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Weatherhead Co., Cleveland, O.

GLOBE VALVES

See Valves, Globe

GOVERNORS, PUMP

Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
● Cash Co., A. W., Decatur, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Hagan Corp., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Watson & McDaniel Co., Philadelphia, Pa.
● Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.

GRILLES

See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Acme Mfg. Co., Holmesburg, Philadelphia, Pa.

Air Control Products, Inc., Coopersville, Mich.
● Air Devices, Inc., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
● Auer Register Co., Cleveland, O.
● Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Central Wire & Iron Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Crown Iron Works, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
● Independent Register Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnston & Chapman Co., Chicago, Ill.
Lockjoint Wood Products Co., Witchita, Kans. (Wood)
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Midco Register Corp., St. Paul, Minn.
Mundt & Sons, Charles, Jersey City, N. J.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Schoendinger, F. O., Columbus, O.
Smith Co., J. B., Philadelphia, Pa.
● Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Bloomfield, N. J.
● Titus Mfg. Corp., Waterloo, Iowa.
Turnbull Mfg. & Dist. Co., Detroit, Mich.
● Tuttle & Bailey, Inc., New Britain, Conn.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Register Co., Battle Creek, Mich.
● Utility Appliance Corp., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Young Regulator Co., Cleveland, O.

GUNS AND POTS, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT

Hill, E. Vernon, Chicago, Ill.
● Newman Co., Inc., I. C., New York, N. Y. (smoke containers)
Pains Fireworks Display Co., New York, N. Y.
Unexcelled Mfg. Co., Inc., New York, N. Y.

HAND SHEARS

See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arjac Products, Inc., Rochester, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Carpenter & Paterson, Inc., East Boston, Mass.
Carty & Moore Engineering Co., Detroit, Mich.
● Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
● Grinnell Co., Inc., Providence, R. I.
Hartmann Co., Chas., Brooklyn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Jennison Co., Fitchburg, Mass. (Adjustable radiator foot rest)
Meco, Inc., Portland, Ore.
● National Radiator Co., The, Johnstown, Pa.
United States Radiator Corp., Detroit, Mich.
Western Hanger Co., San Francisco, Calif.

HANGERS AND SUPPORTS, DUCT

Hexdall Co., A. M., Morris, Ill.
Meco, Inc., Portland, Ore.
Moore Co., Goodloe E., Danville, Ill.
Powder Power Tool Corp., Portland, Ore.

HANGERS AND SUPPORTS, PIPE

American District Steam Co., North Tonawanda, N. Y.
Atlantic Steel Co., Atlanta, Ga.
Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
● Frick Co., Waynesboro, Pa.
Genspring, Inc., New York, N. Y.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Iwan Brothers, Inc., South Bend, Ind.
Korfund Co., Inc., Long Island City, N. Y.
Meco, Inc., Portland, Ore.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Minerallac Electric Co., Chicago, Ill.
Moore Co., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Chicago, Ill.
Powder Power Tool Corp., Portland, Ore.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Reintjes Co., Geo. P., Kansas City, Mo.
● Ric-wiL Co., Cleveland, O. (Underground)
Rockwood Sprinkler Co., Worcester, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.
Russell Mfg. Co., John M., Naugatuck, Conn.
Truscon Steel Co., Youngstown, O.
Western Wire Products Co., St. Louis, Mo.

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HEADERS, WELDED

● Acme Industries, Inc., Jackson, Mich.
American Locomotive Co., Alco Products Div., New York, N. Y.
● Baker Ice Machine Co., Inc., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
Biggs Boiler Works Co., E. Akron, O.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
International Engineering Wks., Inc., Framingham, Mass.
Kellogg Co., M. W., The, New York, N. Y.
Lumsden & Van Stone Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Ohio Pipe Bending & Mach. Co., Cleveland, O.
● Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
● Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw Kendall Engineering Co., Toledo, O.
Vilter Mfg. Co., Milwaukee, Wis.
● Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
● Whitlock Mfg. Co., Hartford, Conn.

HEADS, EXHAUST, FOR PIPE LINES

Cochrane Corp., Philadelphia, Pa.
Dickinson, Aeolus, Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Hoppes Mfg. Co., Inc., Springfield, O.
● Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Wright-Austin Co., Detroit, Mich.

HEADS, SPRINKLER, FOR FIRE PROTECTION

Cleghorn Co., Boston, Mass.
● Grinnell Co., Inc., Providence, R. I.
Hodgman Mfg. Co., Taunton, Mass.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Cooling; Surface, Heating

HEAT PUMPS

See Units, Air Conditioning, Reverse Refrigeration Cycle

● Advertisement in this issue. See Index to Advertisers, pages 411-412

HEATERS, AIR, UNIT, DIRECT FIRED

Acme Equipment Co., Muskogee, Okla.
● Air Devices, Inc., New York, N. Y.
● Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
● Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Columbus Heating & Ventilating Co., Columbus, O.
Despatch Oven Co., Minneapolis, Minn.
● Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
● General Gas Light Co., Kalamazoo, Mich.
● Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Saugas, Mass.
Lee Engineering Co., Youngstown, O.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Mid-Continent Metal Products Co., Chicago, Ill.
National Heater Co., St. Paul, Minn.
National Mfg. & Engineering Co., Detroit, Mich.
Newcomb-Detroit Co., Detroit, Mich.
● Olson & Co., Arthur A., Canfield, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Peerless Mfg. Corp., Louisville, Ky.
Peters-Dalton, Inc., Detroit, Mich.
● Prat-Daniel Corp., East Port Chester, Conn.
Reznor Mfg. Co., Mercer, Pa.
Ross Engineering Corp., J. O., New York, N. Y.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Smith, Inc., James Campbell, Mentor, O.
● Surface Combustion Corp., Toledo, O.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L.I., N.Y.
Twentieth Century Heating and Ventilating Co., Akron, O.
Williams, Inc., F. C., Dearborn, Mich.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Brown Fintube Co., The, Elyria, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Despatch Oven Co., Minneapolis, Minn.
Electromode Corp., Rochester, N. Y.
Falcon Equipment Co., New Brighton, Pa.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Martin-Quaid Co., Philadelphia, Pa.
Tenney Engineering, Inc., Newark, N. J.
Trent Inc., Philadelphia, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, DUCT, GAS

Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland, O.
● Dravo Corp., Pittsburgh, Pa.
● General Gas Light Co., Kalamazoo, Mich.
Great National Air Conditioning Corp., Oklahoma City, Okla.
● Hayes Furnace & Mfg. Co., Inc., Los Angeles, Calif.
International Sales Co., San Francisco, Calif.
Kehm Corp., The, Chicago, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Naco Mfg. Co., Huntington Park, Calif.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Co., Beverly Hills, Calif.
Reznor Mfg. Co., Mercer, Pa.
Royal Heaters, Inc., Alhambra, Calif.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● Surface Combustion Corp., Toledo, O.
Twentieth Century Heating and Ventilating Co., Akron, O.
● Utility Appliance Corp., Los Angeles, Calif.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

Fluid Heat Div., Anchor Post Fence Co., Baltimore, Md.
Stewart-Warner Corp., Chicago, Ill.
● Surface Combustion Corp., Toledo, O.

HEATERS, INDIRECT, SUBMERGED

American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., Elyria, O.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Somerville, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Taco Heaters, Inc., Providence, R. I.
Western Blower Co., Seattle, Wash.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, STEAM JET, FOR LIQUIDS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Gerstein & Cooper Co., Somerville, Mass.
Penberthy Injector Co., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.

HEATERS, STRIP AND IMMERSION, ELECTRIC

American Instrument Co., Silver Spring, Md.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
H. & A. Co., Buffalo, N. Y.
Hynes Electric Heating Co., Camden, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

Consolidated Car-Heating Co., Inc., Albany, N. Y.
Electromode Corp., Rochester, N. Y.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Heating Assurance, Inc., Spokane, Wash.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Johnson Fan & Blower Corp., Chicago, Ill.
Lintern Co., Berea, O.
Martin-Quaid Co., Philadelphia, Pa.
Red Spot Electric Co., Tacoma, Wash.
Roberson Co., L. N., Seattle, Wash.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L. Pittsburgh, Pa.

HEATERS, UNIT, GAS FIRED

● Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Barwick Mfg. Co., Wichita, Kan.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland, O.
● Carrier Corp., Syracuse, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Clow & Sons, James B., Chicago, Ill.
● Dravo Corp., Pittsburgh, Pa.
● General Gas Light Co., Kalamazoo, Mich.
Great National Air Conditioning Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Naco Mfg. Co., Huntington Park, Calif.
Nat Corp, Kansas City, Mo.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Co., Beverly Hills, Calif.
Peerless Mfg. Corp., Louisville, Ky.
● Prat-Daniel Corp., East Port Chester, Conn.
Reznor Mfg. Co., Mercer, Pa.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● Surface Combustion Corp., Toledo, O.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Welding Service Co., Wichita, Kan.
● Wing Mfg. Co., L. J., New York, N. Y.
● Zink Co., John, Tulsa, Okla.

HEATERS, UNIT, OIL FIRED

● Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Beck Engineering Combustion Kompany, St. Louis, Mo.
● Dravo Corp., Pittsburgh, Pa.
Gilbert & Barker Mfg. Co., West Springfield, Mass.

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Mueller Furnace Co., L. J., Milwaukee, Wis.
Perfection Stove Co., Cleveland, O.
● Prat-Daniel Corp., East Port Chester, Conn.
Shafco Distributing Corp., Detroit, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.

HEATERS, UNIT, STEAM AND HOT WATER

Airecon Industries, Detroit, Mich.
● Airtherm Mfg. Co., St. Louis, Mo.
● American Blower Corp., Detroit, Mich.
American Thermal Industries, Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corp., Allston, Boston, Mass.
Bern's Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Champion Unit Heater Co., Chicago, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
● Dunham Co., C. A., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engrg. Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Johnson Fan & Blower Corp., Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
● King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J. Wausau, Wis.
● National Radiator Co., The, Johnstown, Pa.
Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
● New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
● Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Semco Mfg. Co., Nashville, Tenn.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
Temp-Control, Inc., Peoria, Ill.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
● Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Wilson Engineering Corp., Chicago, Ill.
● Wing Mfg. Co., L. J., New York, N. Y.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Ventilators, Unit

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Cleghorn Co., Boston, Mass.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Glo Heat Equipment Co., New York, N. Y.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
International Heater Co., Utica, N. Y.
● Prox Co., Inc., Frank, Terre Haute, Ind.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
Stokol Stoker Co., Inc., Indianapolis, Ind.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

HEATERS, WATER, ELECTRIC

Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bogue Electric Co., Paterson, N. J.
Brown Fintube Co., Elyria, O.
Bryant Heater Co., Cleveland, O.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Somerville, Mass.
Glo Heat Equipment Co., New York, N. Y.
Hotpoint Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Martin-Quaid Co., Philadelphia, Pa.
Red Spot Electric Co., Tacoma, Wash.
Rheem Mfg. Co., New York, N. Y.
Smith Corp., A. O., Milwaukee, Wis.
Trent Inc., Philadelphia, Pa.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.

HEATERS, WATER, GAS FIRED

● Aldrich Co., The, Wyoming, Ill.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., LaPorte, Ind.
Birchfield Boiler, Inc., Tacoma, Wash.
Brown Fintube Co., Elyria, O.
Bryant Heater Co., Cleveland, O.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Gerstein & Cooper Co., Somerville, Mass.
Heat Equipment not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Kehm Corp., The, Chicago, Ill.
Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Mission Appliance Corp., Los Angeles, Calif.
Montgomery Bros., San Francisco, Calif.
Mueller Furnace Co., L. J., Milwaukee, Wis.
● National Radiator Co., The, Johnstown, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
Richmond Radiator Co., New York, N. Y.
Rheem Mfg. Co., New York, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Ruud Mfg. Co., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
● Sellers Engineering Co., Chicago, Ill.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Smith Corp., A. O., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swett & Co., George E., San Francisco, Calif.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
Wood Mfg. Co., John, Conshohocken, Pa.

HEATERS, WATER, INDIRECT

Akwa Heaters, Inc., New York, N. Y.
American District Steam Co., North Tonawanda, N. Y.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Bell & Gossett Co., Morton Grove, Ill.
Bryant Heater Co., Cleveland, O.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Duffy Engineering Co., Portland, Ore.
Ferguson & Lange Foundry Co., Chicago, Ill.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Somerville, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kehm Corp., The, Chicago, Ill.
Lewis & Co., Joseph E., Baltimore, Md.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Heating Corp., Chicago, Ill.
Western Blower Co., Seattle, Wash.
● Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

● Bell & Gossett Co., Morton Grove, Ill.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Burnham Corp., Boiler Div., Irvington, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Gerstein & Cooper Co., Somerville, Mass.
Heat Equipment not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.

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Hotstream Heater Co., Cleveland, O.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Penberthy Injector Co., Detroit, Mich.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Taco Heaters, Inc., Providence, R. I.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
● Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, OIL FIRED

Aeroil Products Co., West New York, N. J. (portable)
● Air Devices, Inc., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Aldrich Co., The, Wyoming, Ill.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Birchfield Boiler, Inc., Tacoma, Wash.
Brown Electric Co., Forest Hills, N. Y.
Brown Fintube Co., The, Elyria, O.
Bryant Heater Co., Cleveland, O.
Catskill Metal Works, Inc., Catskill, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey Shepard Boiler Co., Peru, Ind.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
Gerstein & Cooper Co., Somerville, Mass.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Heat Equipment not Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Johnson Co., S. T., Philadelphia, Pa.
Kleen-Heet, Inc., Chicago, Ill.
Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Lonergan Mfg. Co., Albion, Mich.
Nu-way Corp., The, Rock Island, Ill.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Penn Boiler & Burner Co., Lancaster, Pa.
● Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rheem Mfg. Co., New York, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Spencer Heater Div., Avco Corp., Williamsport, Pa.
Stokol Stoker Co., Inc., Indianapolis, Ind.
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York Electric and Machine Co., York, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, STEAM, INSTANTANEOUS

Akwa Heaters, Inc., New York, N. Y.
American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Brownell Co., Dayton, O.
Coe Mfg. Co., Painesville, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downington, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Somerville, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
Heat Transfer Products, Inc., Carbondale, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lewis & Co., Joseph E., Baltimore, Md.
Montgomery Bros., San Francisco, Calif.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pick Mfg. Co., West Bend, Wis. (direct steam injection)
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Swartwout Co., Cleveland, O.
● Taco Heaters, Inc., New York, N. Y.
● Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, STEAM, STORAGE

Akwa Heaters, Inc., New York, N. Y.
Alert Engineering Products, Detroit, Mich.
American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Co., Elizabeth, N. J.
Downingtown Iron Works, Downington, Pa.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Somerville, Mass.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
International Engineering Wks., Inc., Framingham, Mass.
Johnson Corp., The, Three Rivers, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Manitowoc Boiler Wks., Manitowoc, Wis.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Syracuse, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Injector Co., Detroit, Mich.
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Rotary Mfg. Co., Los Angeles, Calif.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stout & Sons, David, St. Louis, Mo.
● Swartwout Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Waterfilm Boilers, Inc., Jersey City, N. J.
Western Blower Co., Seattle, Wash.
● Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters Inc., New York, N. Y.

HEATERS, WATER, STEEL, COAL FIRED

Aeroil Products Co., West New York, N. J. (Portable)
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Catskill Metal Works, Inc., Catskill, N. Y.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
Heat Equipment not Inc., Chicago, Ill.
International Engineering Wks., Inc., Framingham, Mass.
Johnson Bros., Inc., Ferrysburg, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Rheem Mfg. Co., San Francisco, Calif.
Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
● Terre Haute Boiler Works, Co., Terre Haute, Ind.

HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Heating

HEATING SURFACE

See Surface, Heating

HOSE CLAMPS

See Clamps, Hose

HOSE, METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
● Bendix Aviation Corp., Eclipse—Pioneer Div., Metal Hose Dept., Teterboro, N. J.
Brockway Co., Naugatuck, Conn.
● Chicago Metal Hose Corp., Maywood, Ill.
Everhot Products Co., Chicago, Ill.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
● Zallea Brothers, Wilmington, Del.

HOSE, NON-METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Ventilating Hose Co., New York, N. Y.
Arrowhead Rubber Co., Los Angeles, Calif.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
DeVilbiss Co., The, Toledo, O.

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- Flexible Tubing Corp., Branford, Conn.
- Gates Rubber Co., The, Denver, Colo.
- Goodrich Co., B. F., Akron, O.
- Goodyear Tire & Rubber Co., Akron, O.
- Hamilton Rubber Mfg. Corp., Trenton, N. J.
- Independent Pneumatic Tool Co., Aurora, Ill.
- Raybestos-Manhattan, Inc., Passaic, N. J.
- Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
- Resistoflex Corp., Belleville, N. J.
- Roylyn, Inc., Glendale, Calif.
- Thermoid Co., Trenton, N. J.
- United States Rubber Co., New York, N. Y.

HOSE, VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOT WATER HEATING SYSTEMS, BALANCING ELBOWS FOR

See Elbows, Balancing, for Hot Water Heating System

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

- Airborne Industries, Inc., Minneapolis, Minn.
- ● Bishop & Babcock Mfg. Co., Cleveland, O.
- Brundage Co., The, Kalamazoo, Mich.
- Circulator & Devices Mfg. Corp., New York, N. Y.
- ● Clarage Fan Co., Kalamazoo, Mich.
- Commercial Shearing & Stamping Co., Youngstown, O.
- Detroit Stamping Co., Detroit, Mich.
- Garden City Fan Co., Chicago, Ill.
- Gates Engineering Co., Wilmington, Del.
- Hastings Air Conditioning Co., Hastings, Neb.
- Johnson Fan & Blower Co., Chicago, Ill.
- Lau Blower Co., Dayton, O.
- Martin Fan & Blower Co., Chicago., Ill.
- Maysteel Products, Inc., Milwaukee, Wis.
- National Mfg. & Engineering Co., Detroit, Mich.
- Northern Blower Co., Cleveland, O.
- SKF Industries, Inc., Philadelphia, Pa.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Utica Products, Inc., Utica, N. Y.
- Viking Air Conditioning Corp., Cleveland, O.

HOUSINGS, FAN, PROPELLER

(Housings only—not complete fans)

- Allen Ventilator Div., Production Planning Co., Rochester, Mich.
- Circulators & Devices Mfg. Corp., New York, N. Y.
- Commercial Shearing & Stamping Co., Youngstown, O.
- ● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Gates Engineering Co., Wilmington, Del.
- Schwitzer-Cummins Co., Indianapolis, Ind.

HUMIDIFIERS, CENTRAL PLANT

- ● Air & Refrigeration Corp., New York, N. Y.
- ● American Blower Corp., Detroit, Mich.
- American Foundry & Furnace Co., Bloomington, Ill.
- ● Armstrong Machine Wks., Three Rivers, Mich.
- Bahnson Co., Winston-Salem, N. C.
- ● Barber-Colman Co., Rockford, Ill.
- ● Carrier Corp., Syracuse, N. Y.
- ● Clarage Fan Co., Kalamazoo, Mich.
- Cleveland Humidifier Co., Cleveland, O.
- Farr Co., Los Angeles, Calif.
- ● Johnson Service Co., Milwaukee, Wis.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- Mellish & Murray Co., Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- National Air Conditioning, Inc., Johnstown, Pa.
- National Engineering & Mfg. Co., Kansas City, Mo.
- Parks-Cramer Co., Fitchburg, Mass.
- ● Powers Regulator Co., Chicago, Ill.
- Skuttle Mfg. Co., Detroit, Mich.
- Steamaire Co., Cincinnati, O.
- ● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
- ● Surface Combustion Corp., Toledo, O.
- ● Trane Co., The, LaCrosse, Wis.
- Viking Air Conditioning Corp., Cleveland, O.
- Vilter Mfg. Co., Milwaukee, Wis.
- York Corp., York, Pa.

HUMIDIFIERS, DIRECT, SPRAY HEAD

- American Moistening Co., Providence, R. I.
- Anetsberger Bros., Chicago, Ill.
- ● Armstrong Machine Works, Three Rivers, Mich.
- Bahnson Co., Winston-Salem, N. C. (Centrifugal).
- Binks Mfg. Co., Chicago, Ill.
- Blower Application Co., Milwaukee, Wis.
- ● Buffalo Forge Co., Buffalo, N. Y.
- Drying Systems, Inc., Chicago, Ill.
- ● Grinnell Co., Inc., Providence, R. I.
- International Moistening Co., Providence, R. I.
- ● Maid-O'Mist, Inc., Chicago, Ill.
- Manufacturers Machine Co., North Andover, Mass.
- ● Marley Co., Inc., The, Kansas City, Kans.
- ● Murray Mfg. Co., D. J., Wausau, Wis.
- ● New York Blower Co., Chicago, Ill.
- Parks-Cramer Co., Fitchburg, Mass.
- Pfening Co., Fred D., Columbus, O.
- Rhode Island Humidifier & Ventilating Co., Boston, Mass.
- Ross Sprinkler Co., Pasadena, Calif.
- Somers, Inc., H. J., Detroit, Mich.
- Spray Engineering Co., Somerville, Mass.
- ● Spraying Systems Co., Chicago, Ill.
- Steamaire Co., Cincinnati, O.
- Supreme Electric Products Corp., Rochester, N. Y.
- ● Trane Co., The, LaCrosse, Wis.
- ● Utility Appliance Corp., Los Angeles, Calif.
- Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

- Bridgeport Brass Co., Bridgeport, Conn.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- ● Maid-O'-Mist, Inc., Chicago, Ill.
- Patent Novelty Co., Fulton, Ill.
- Skilbeck Mfg. Co., Kenosha, Wis.
- Techtmann Industries, Inc., Milwaukee, Wis.

HUMIDIFIERS, RADIATOR VENT VALVE

- ● Maid-O'-Mist, Inc., Chicago, Ill.
- Skilbeck Mfg. Co., Kenosha, Wis.

HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

- ● Carrier Corp., Syracuse, N. Y.
- Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Lion Mfg. Corp., Chicago, Ill.
- ● Murray Mfg. Co., D. J., Wausau, Wis.
- National Engineering & Mfg. Co., Kansas City, Mo.
- Palmer Mfg. Corp., Phoenix, Ariz.
- Somers, Inc., H. J., Detroit, Mich.
- ● Spraying Systems Co., Chicago, Ill.
- Standard Engineering Wks., Pawtucket, R. I.
- Steamaire Co., Cincinnati, O.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Walton Laboratories, Inc., Irvington, N. J.
- Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

- American Instrument Co., Silver Spring, Md.
- American Moistening Co., Providence, R. I.
- ● Autempco Corp., New York, N. Y.
- Bahnson Co., Winston-Salem, N. C.
- ● Barber-Colman Co., Rockford, Ill.
- Bristol Co., The, Waterbury, Conn.
- Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
- ● General Controls Co., Glendale, Calif.
- H-B Instrument Co., Philadelphia, Pa.
- ● Johnson Service Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Parks-Cramer Co., Fitchburg, Mass.
- ● Penn Electric Switch Co., Goshen, Ind.
- ● Powers Regulator Co., Chicago, Ill.
- Standard Engineering Wks., Pawtucket, R. I.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- White-Rodgers Electric Co., St. Louis, Mo.

HUMIDITY INDICATORS

See Indicator-Controllers, Relative Humidity; Psychrometers

HUMIDITY RECORDERS

See Recorders, Humidity

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HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

American Instrument Co., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Scientific Equipment Co., Philadelphia, Pa.
Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
International Moistening Co., Providence, R. I.
● Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Wallace & Tiernan Co., Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.

HYGROSTATS

See Humidistats

IDENTIFICATION MARKERS (For Piping Services)

Western Lithograph Co., Los Angeles, Calif.

IMMERSION THERMOSTATS

See Thermostats, Immersion

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co. Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark., Palmyra, N. J.
Electro Products Laboratories, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
● Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

American Instrument Co., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATOR-CONTROLLERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Wheelco Instruments Co., Chicago, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For Portable CO_2 Analyzers, See Analyzers, Carbon Dioxide, Portable

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Chas., Newark, N. J.
Ess Instrument Co., Bergenfield, N. J.
● Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Weaver Mfg. Co., Springfield, Ill.

INDICATORS, DEW POINT

Foxboro Co., Foxboro, Mass.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.

INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL, BOILER AND TANK

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
● Henry Valve Co., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
● McDonnell & Miller, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Petrometer Corp., Long Island City, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Rochester Mfg. Co., Inc., Rochester, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

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Wallace & Tiernan Co., Inc., Newark, N. J.
Weatherhead Co., Cleveland, O.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
● Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, SOUND LEVEL

● General Electric Co., Apparatus Dept., Schenectady, N. Y.

INDIRECT HEATING SURFACE

See Surface, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INJECTOR RECIRCULATORS FOR REFRIGERANTS

Phillips & Co., H. A., Chicago, Ill.

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSULATION, BOILER AND TANK

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa. (85% Magnesia)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Cork Import Corp., Englewood, N. J. (Corkboard)
Cork Insulation Co., Inc., New York, N. Y. (Cork)
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
Forty-Eight Insulations, Inc., Aurora, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Jamar Co., Walker, Duluth, Minn.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Monsanto Chemical Co., Merimac Div., Boston, Mass.
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steel, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y. (Rock wool)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and magnesia)
● Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., The, Insulation Div., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Blanket, block, cement)
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos, magnesia)
Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Telsit Insulation Co., Bronx, N. Y.
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Co., Kearny, N. J. (Cork)
United States Mineral Wool Co., South Milwaukee, Wis.
Western Mineral Products Co., Omaha, Neb.
● Wilson, Inc., Grant, Chicago, Ill.
● Zonolite Co., Chicago, Ill (plastic)

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
Air-O-Cel Co., Detroit, Mich.
Alfol Insulation Co., Inc., New York, N. Y., (Aluminum foil)
Alton Mineral Wool Insulation Co., St. Louis, Mo.
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibre board)
Bache & Co., Semon, New York, N. Y. (Glass wool)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Rock wool)
Carney Co., Inc., The, Mankato, Minn.
Celotex Corp., The, Chicago, Ill.
Certain-teed Products Corp., Ardmore, Pa.
Chamberlin Co. of America, Detroit, Mich. (Rock wool)
Cork Import Corp., Englewood, N. J. (Corkboard, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Dry-Zero Corp., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O. (Mineral wool, blankets, batts, granulated, loose)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibre-board)
Flintkote Co., The, New York, N. Y. (Glass wool)
General Insulating Products Co., Brooklyn, N. Y. (Rock wool)
Hogan & Co., Inc., C. T., New York, N. Y. (reflective)
● Infra Insulation, Inc., New York, N. Y. (reflective)
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wool fibre)
Insul-Wool Insulation Corp., Wichita, Kans.
International Vermiculite Co., Girard, Ill. (Loose fill)
Johns-Manville, New York, N. Y. (Rock wool and wood fibre-board)
Johnston Tin Foil & Metal Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
Keasbey Co., Robert A., New York, N. Y. (Rock wool)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Kimberly-Clark Corp., Neenah, Wis.
Masonite Corp., Cellufoam Products Div., Chicago, Ill. (Blanket)
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Multi-Cell Sales Corp., Minneapolis, Minn. (Blanket, quilted newspaper)
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn & Steel, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
Poe Co., C. W., Cleveland, O.
Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
Reynolds Metals Co., Louisville, Ky.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Russell Co., F. C., The, Cleveland, O.
Silvercote Products, Inc., Chicago, Ill.
Specialty Converters, Inc., East Braintree, Mass. (Reflective Insulation)
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
Standard Lime & Stone Co., Baltimore, Md. (Rock wool)
● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Tennessee Products and Chemical Corp., Nashville, Tenn.
Truscon Steel Co., Youngstown, O. (Insulation board sealed between metal sheets)
United Cork Companies, Lyndhurst, N. J. (Cork)
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., South Milwaukee, Wis. (Mineral wool)
Universal Gypsum & Lime Co., Chicago, Ill. (Loose fill)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Mineral Products Co., Omaha, Neb.
● Wilson & Co., Inc., Chicago, Ill. (Board)
● Wilson, Inc., Grant, Chicago, Ill. (Rock wool)
Wood Conversion Co., St. Paul, Minn.
● Zonolite Co., Chicago, Ill. (Loose fill)

INSULATION, DUCT, SOUND DEADENING

For Application Inside Duct

Baldwin-Hill Co., Trenton, N. J.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Celotex Corp., The, Chicago, Ill.
Dry-Zero Corp., Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Company, The, Boston, Mass.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Moore Co., Goodloe E., Danville, Ill.
Mortell Co., J. W., Kankakee, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Robinson Insulation Co., Great Falls, Mont.
● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
United States Rubber Co., New York, N. Y.
Western Felt Works, Chicago, Ill.
● Wilson, Inc., Grant, Chicago, Ill.
● Zonolite Co., Chicago, Ill.

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INSULATION, DUCT, THERMAL

- Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
- Air-O-Cel Co., Detroit, Mich.
- Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
- American Flange & Mfg. Co., Inc., New York, N. Y.
- American Hair & Felt Co., Chicago, Ill. (Hair felt)
- Armstrong Cork Co., Lancaster, Pa. (Corkboard)
- Arrowhead Rubber Co., Los Angeles, Calif.
- Baldwin-Hill Co., Trenton, N. J.
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos)
- Celotex Corp., The, Chicago, Ill.
- Cork Import Corp., Englewood, N. J. (Corkboard, mineral wool board)
- Cork Insulation Co., Inc., New York, N. Y. (Cork board)
- Dry-Zero Corp., Chicago, Ill.
- Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
- Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
- Felters Company, The, Boston, Mass. (Wool felt)
- Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
- General Insulating Products Co., Brooklyn, N. Y. (Acoustic rock wool)
- Hinde & Dauch Paper Co., Sandusky, O.
- ● Infra Insulation, Inc., New York, N. Y.
- Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
- International Vermiculite Co., Girard, Ill. (Block)
- Johns-Manville, New York, N. Y. (Rock cork, asbestos)
- Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
- Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
- Keystone Asphalt Products Co., Chicago, Ill.
- Kimberly-Clark Corp., Neenah, Wis.
- Masonite Corp., Chicago, Ill.
- Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
- Mortell Co., J. W., Kankakee, Ill.
- ● Mundet Cork Corp., North Bergen, N. J. (Cork)
- Munn and Steele, Inc., Newark, N. J.
- National Gypsum Co., Buffalo, N. Y. (Block)
- Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and wool felt)
- ● Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
- Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
- Paraffine Companies, Inc., The, Insulation Div., San Francisco, Calif.
- Pittsburgh Corning Corp., Pittsburgh, Pa.
- Pittsburgh Plate Glass Co., Pittsburgh, Pa.
- Poe Co., C. W., Cleveland, O.
- Quigley Co., Inc., New York, N. Y.
- Refractory & Insulation Corp., New York, N. Y. (Block, blanket)
- Reynolds Metals Co., Louisville, Ky.
- Robinson Insulation Co., Great Falls, Mont.
- Rock Fleece Co., El Paso, Tex.
- Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
- Sall Mountain Co., Chicago, Ill. (Asbestos)
- Schundler & Co., Inc., F. E., Long Island City, N. Y.
- Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell type)
- Sprayo-Flake Co., Chicago, Ill.
- Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
- ● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
- Telsit Insulation Co., Bronx, N. Y.
- United Cork Companies, Lyndhurst, N. J. (Cork)
- United States Mineral Wool Co., South Milwaukee, Wis.
- Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
- Western Felt Wks., Chicago, Ill. (Felt)
- ● Wilson & Co., Inc., Chicago, Ill. (Flexible)
- ● Wilson, Inc., Grant, Chicago, Ill.
- Wood Conversion Co., St. Paul, Minn.
- ● Zonolite Co., Chicago, Ill. (plastic)

INSULATION FASTENERS

See Fasteners, Insulation

INSULATION, PIPE

- Acme Asbestos Covering & Flooring Co., Chicago, Ill.
- Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
- American District Steam Co., North Tonawanda, N. Y. (Underground)
- American Hair & Felt Co., Chicago, Ill.
- Armstrong Cork Co., Lancaster, Pa. (Cork)
- Badham Insulation Co., Inc., Birmingham, Ala.
- Baldwin-Hill Co., Trenton, N. J. (Rock wool)
- Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos, magnesia)
- Cork Import Corp., Englewood, N. J. (Corkboard)
- Cork Insulation Co., New York, N. Y.
- ● Durant Insulated Pipe Co., Palo Alto, Calif. (Underground)
- Eagle-Picher Co., Cincinnati, O. (Mineral wool)
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Forty-Eight Insulations, Inc., Aurora, Ill.
- International Vermiculite Co., Girard, Ill. (Vermiculite)
- Jamar Co., Walker, Duluth, Minn.
- Johns-Manville, New York, N. Y. (Asbestos, magnesia, rock cork)
- Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
- Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
- ● Lexington Supply Co., The, Cleveland, O. (waterproof protective fabric)
- Masonite Corp., Chicago, Ill.
- Mortell Co., J. W., Kankakee, Ill.
- ● Mundet Cork Corp., North Bergen, N. J. (Cork)
- Munn and Steele, Inc., Newark, N. J.
- Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
- National Gypsum Co., Buffalo, N. Y. (Moulded)
- Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos, magnesia)
- ● Owens-Corning Fiberglas Corp., Toledo, O. (Sectional and flexible)
- Pacific States Felt Mfg. Co., Inc., San Francisco, Calif.
- Paraffine Companies, Inc., Insulation Div., San Francisco, Calif.
- Pittsburgh Corning Corp., Pittsburgh, Pa.
- Poe Co., C. W., Cleveland, O.
- ● Porter & Co., Inc., H. W., Newark, N. J. (Underground)
- Presstite Engineering Co., St. Louis, Mo.
- ● Ric-wiL Co., Cleveland, O. (Underground)
- Robinson Insulation Co., Great Falls, Mont.
- Rock Fleece Co., El Paso, Tex.
- Ruberoid Co., New York, N. Y. (Asbestos, magnesia, calsilite)
- Sall Mountain Co., Chicago, Ill. (Asbestos and wool felt)
- Schundler & Co., Inc., F. E., Long Island City, N. Y.
- Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell, wool felt and hair felt)
- Standard Asbestos Mfg. Co., Chicago, Ill.
- Union Asbestos & Rubber Co., Cicero, Ill.
- United Cork Companies, Lyndhurst, N. J.
- Western Mineral Products Co., Omaha, Neb. (Underground)
- ● Wilson, Inc., Grant, Chicago, Ill.
- ● Zonolite Co., Chicago, Ill.

IONIZATION APPARATUS

- Coroaire Heater Corp., The, Cleveland, O.
- General Ozone Corp., Chicago, Ill.
- Montgomery Bros., San Francisco, Calif.
- United States Ozone Co. of America, Scottdale, Pa.
- Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

IRON BODY VALVES

See Valves, Gate; and Valves, Globe

JACKETED PIPE

See Pipe, Jacketed

JOINTS, PIPE, ELECTRICAL INSULATING

- American Hard Rubber Co., New York, N. Y.
- Barco Mfg. Co., not Inc., Chicago, Ill.
- Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

JOINTS, PIPE, EXPANSION, PACKLESS

- American District Steam Co., North Tonawanda, N. Y.
- Badger Fire Extinguisher Co., Somerville, Mass.
- Badger & Sons Co., E. B., Cambridge Div., Cambridge, Mass. (Corrugated copper, stainless steel)
- Barco Mfg. Co., not Inc., Chicago, Ill.
- ● Chicago Metal Hose Corp., Maywood, Ill.
- Croll-Reynolds Engineering Co., Inc., New York, N. Y.
- Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
- Foster Wheeler Corp., New York, N. Y.
- ● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
- Harris & Co., Arthur, Chicago, Ill.
- Kaiser Co., E. B., Chicago, Ill.
- Kopperman & Sons, Joseph, Philadelphia, Pa.
- MagniLastic Div., Cook Electric Co., Chicago, Ill.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Northern Indiana Brass Co., Elkhart, Ind.
- ● Ric-wiL Co., Cleveland, O.
- Semet-Solvay Engineering Corp., New York, N. Y.
- United States Rubber Co., New York, N. Y.
- ● Zallea Brothers, Wilmington, Del.

JOINTS, PIPE, EXPANSION, SLIP

- American District Steam Co., North Tonawanda, N. Y.
- Belfield Co., H., Philadelphia, Pa.
- Chase Brass & Copper Co., Waterbury, Conn.
- Clow & Sons, James B., Chicago, Ill.
- ● Crane Co., Chicago, Ill.
- Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
- Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
- ● Illinois Engineering Co., Chicago, Ill.
- Jarecki Mfg. Co., Erie, Pa.
- Northern Indiana Brass Co., Elkhart, Ind.
- Parks-Cramer Co., Fitchburg, Mass. (jacketed)
- Powell Co., Wm., Cincinnati, O.
- ● Ric-wiL Co., Cleveland, O.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Semet-Solvay Engineering Corp., New York, N. Y.
- ● Walworth Co., New York, N. Y.
- ● Webster & Co., Warren, Camden, N. J.
- ● Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE SWING AND REVOLVING

- Barco Mfg. Co., not Inc., Chicago, Ill.
- Bordo Co., Inc., L. J., Glenside, Pa.
- Chiksan Co., Brea, Calif.
- Flexo Supply Co., Inc., St. Louis, Mo.
- Hinderliter Tool Co., The, Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
- Johnson Corp., The, Three Rivers, Mich.
- Moran Flexible Joint Co., Inc., Louisville, Ky.

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Patterson-Ballagh Corp., Los Angeles, Calif.
Powell Co., Wm., Cincinnati, O.
Snyder Sales Corp., Los Angeles, Calif.
● **Spraying Systems Co., Chicago, Ill.**

JOINTS, UNIVERSAL, FOR OPERATING VALVES

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blood Brothers Machine Co., Allegan, Mich.
Brooks Equipment Corp., Hoboken, N. J.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghamton, N. Y. (flexible shafts)

KATA THERMOMETERS

See Thermometers, Kata

LACQUERS

See Enamels and Lacquers

LAGGING ADHESIVES

See Adhesives, for Pipe Covering

LAMPS, STERILIZING, FOR DUCT INSTALLATION

C-B Tool Co., Lancaster, Pa.
Coleman-Petterson Corp., Cleveland, O.
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Lustra Corp. of America, New York, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

LEAD PIPE

See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS

See Sheets, Lead

LEAD TUBING

See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS

See Detectors, Leak, Refrigerant

LEATHER BELTING

See Belting, Flat, Leather

LEATHER PACKING

See Packing, Leather

LIGHTS, PILOT AND SIGNAL

Armstrong Control Co., Inc., Portland, Ore.
Cooper Co., Clark, Palmyra, N. J.
Dial Light Co. of America, Inc., New York, N. Y.
● **General Controls Co., Glendale, Calif.**
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Signal Indicator Co., New York, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

LINKS, FUSIBLE

● **Grinnell Co., Inc., Providence, R. I.**
Morse-Smith-Morse, Inc., Watertown, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.

LIQUID LEVEL GAGES

See Gages, Liquid Level

LIQUID LEVEL INDICATORS

See Indicators, Liquid Level

LIQUID LEVEL RECORDERS

See Recorders, Liquid Level

LIQUID LEVEL REGULATORS

See Regulators, Liquid Level

LIQUID PRESSURE REGULATORS

See Regulators, Pressure, Liquid

LOCATORS, PIPE, UNDERGROUND

Fisher Research Laboratory, Inc., Palo Alto, Calif.
Globe Phone Mfg. Co., Boston, Mass.

LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

LOCK NUTS

See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

● **Air Conditioning Products Co., Detroit, Mich.**
Air Control Products, Inc., Coopersville, Mich.
● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Arex Co., Chicago, Ill.
B & B Tool & Specialty Co., The, Dayton, O.
● Barber-Colman Co., Rockford, Ill.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Biersach & Niedermeyer Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● **Buffalo Forge Co., Buffalo, N. Y.**
Burt Mfg. Co., Akron, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
Clay Equipment Corp., Cedar Falls, Ia.
Conoflow Corp., Philadelphia, Pa.
Dana Fan & Blower Corp., Cincinnati, O.
● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kelvin-White Co. Boston, Mass.
● King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lockjoint Wood Products Co., Wichita, Kans. (Wood; stationary door, wall, window and ceiling)
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Meyer Mfg. Co., Detroit, Mich.
Meyers Electric Co., Inc., Pittsburgh, Pa.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Nelson Corp., Herman, Moline, Ill.
Peerless Electric Co., Warren, O.
Reed Unit-Fans, Inc., New Orleans, La.
Richmond Fireproof Door Co., Richmond, Ind.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Signal Electric Mfg. Co., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
● **Standard Stamping & Perforating Co., Chicago, Ill.**
● **Swartwout Co., Cleveland, O.**
● **Tuttle & Bailey, Inc., New Britain, Conn.**
United States Gypsum Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
● **Utility Appliance Corp., Los Angeles, Calif.**
Van Noorden Co., E., Boston, Mass.
Victor Electric Products, Inc., Cincinnati, O.

LOW WATER CUT-OFFS

See Cut-Offs, Low Water, Heating Boiler

MACHINES, BALANCING

See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT

For Reproducing Engineering Drawings

American Photocopy Equipment Co., Chicago, Ill.
Bruning Co., Inc., Charles, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Ozalid Div. of General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.
Peck & Harvey, Chicago, Ill.
Wickes Brothers, Saginaw, Mich.

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MACHINES AND FILM, X-RAY

Eastman Kodak Co., Rochester, N. Y.
Kelley Koett Mfg. Co., The, Covington, Ky.
North American Philips Co., Inc., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

MACHINES, FLANGING, PIPE AND TUBE

Leonard Precision Products Co., Garden Grove, Calif.

MACHINES, FLARING, PIPE AND TUBE

Leonard Precision Products Co., Garden Grove, Calif.

MACHINES, PIPE CLEANING

Continental Machine Co., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE

Air Reduction Sales Co., New York, N. Y. (Cutting and beveling)
American Die & Tool Co., Inc., Reading, Pa.
Beaver Pipe Tools, Inc., Warren, O.
Century Engineering Co., Los Angeles, Calif.
Curtis & Curtis Co., The, Bridgeport, Conn.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machine Works, Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O. (Hand)
Toledo Pipe Threading Machine Co., Toledo, O.
V-Mac Industries, Guilford, Conn.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY

Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Curtis & Curtis Co., The, Bridgeport, Conn.
Landis Machine Co., Inc., Waynesboro, Pa.
Obear, E. L., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.
Pines Engineering Co., Inc., Aurora, Ill.
Saunders Machine & Tool Corp., Yonkers, N. Y.
Stratford Pipe Scalloper Machine Co., Stratford, Conn.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PITTSBURGH LOCK FORMING

Dahlstrom Machine Works, Chicago, Ill.
Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.

MACHINES, REFRIGERATION, ABSORPTION

Vogt Machine Co., Henry, Louisville, Ky.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

MACHINES, TESTING, WELD

Air Reduction Sales Co., New York, N. Y.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

MACHINES, VERTICAL, THREADING AND BORING

Bullard Co., The, Bridgeport, Conn.

MAGNESIUM ALLOY SHEETS

See Sheets, Magnesium Alloy

MAGNESIUM TUBING

See Tubing, Magnesium

MALLEABLE UNIONS

See Unions, Malleable

MANIFOLDS, REFRIGERATION

Ball Welding Works, Inc., Oakland, Calif.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Weatherhead Co., Cleveland, O.
York Corp., York, Pa.

MANOMETERS

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence Co., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
● Hays Corp., Michigan City, Ind.
Hill, E. Vernon, Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
King Engineering Corp., Ann Arbor, Mich.
Meriam Instrument Co., The, Cleveland, O.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Wallace & Tiernan Co., Inc., Newark, N. J.

MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

Keystone Carbon Co., Inc., St. Marys, Pa.
Moraine Products Div., General Motors Corp., Dayton, O.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METERS, AIR VELOCITY, DIRECT READING

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Hastings Instrument Co., Hampton, Va.
● Hays Corp., Michigan City, Ind.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.

METERS, CONDENSATION

American District Steam Co., North Tonawanda, N. Y.
Buffalo Meter Co., Buffalo, N. Y.
Central Station Steam Co., Detroit, Mich.
Neptune Meter Co., New York, N. Y.
Tagliabue Corp., C. J., Newark, N. J.

METERS, FLOW, REFRIGERANT

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
● Hays Corp., Michigan City, Ind.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Trimount Instrument Co., Chicago, Ill.

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METERS, FLOW, STEAM

American District Steam Co., North Tonawanda, N. Y.
American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

METERS, PROCESS LIQUID

American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles Calif.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Worthington-Gamon Meter Co., Newark, N. J.

METERS, VOLUME, AIR AND GAS

American Meter Co., Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Fischer & Porter Co., Hatboro, Pa.
● Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.

METERS, WATER

Bailey Meter Co., Cleveland, O.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Hersey Mfg. Co., South Boston, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
National Meter Co., Brooklyn, N. Y.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pfening Co., Fred D., Columbus, O. (batch measuring)
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Union Water Meter Co., Worcester, Mass.
Worthington-Gamon Meter Co., Newark, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water Modulating

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR STARTERS

See Controllers and Starters, Motor

MOTORS, ELECTRIC, FRACTIONAL HP

Ace Electric Corp., Bedford, Ind.
● Aldrich Co., The, Wyoming, Ill.
Alliance Mfg. Co., Alliance, O. (Shaded pole)
Ampex Electric Corp., San Carlos, Calif.
● Baldor Electric Co., St. Louis, Mo.
● Barber-Colman Co., Rockford, Ill.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Brown Electric Co., Forest Hills, N. Y.
Burke Electric Co., Erie, Pa.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Century Electric Co., St. Louis, Mo.
Clark Electric Co., Memphis, Tenn.
Crise Mfg. Co., The, Columbus, O.
Crozier Machine Tool Co., Hawthorne, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
FASCO Industries, Inc., Rochester, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Franklin Electric Co., Inc., Bluffton, Ind.
General Die and Stamping Co., New York, N. Y.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hansen Mfg. Co., Inc., Princeton, Ind.
Holtzer-Cabot Div. The Leland Electric Co., Dayton, O.
Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
Janette Mfg. Co., Chicago, Ill.
Lamb Electric Co., Kent, O.
Leland Electric Co., Dayton, O.
Lima Electric Motor Co., Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Master Electric Co., Dayton, O.
● Moore Co., The, Kansas City, Mo., (Slow speed fan motors)
Ohio Electric Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Piqua Machine & Mfg. Co., Piqua, O.
Portable Electric Tools, Inc., Chicago, Ill.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., Chicago, Ill.
Robbins & Myers, Inc., Springfield, O.
Rotor Corp., Miamisburg, O.
Royal Mfg. Corp., Waterloo, Ind.
Russell Electric Co., Chicago, Ill.
Signal Electric Mfg. Co., Menominee, Mich.
Smith Corp., A. O., Milwaukee, Wis.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Standard Motor Corp., Elyria, O.
Torq Electric Mfg. Corp., Bedford, O.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
● Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whirlaway Motors, Inc., Tipp City, O.

MOTORS, ELECTRIC, 1 HP AND OVER

Allis Co., Louis, The, Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
● Baldor Electric Co., St. Louis, Mo.
Bogue Electric Co., Paterson, N. J.
Brown-Brockmeyer Co., Inc., Dayton, O.
Brown Electric Co., Forest Hills, N. Y.
Burke Electric Co., Erie, Pa.
Century Electric Co., St. Louis, Mo.
Clark Electric Co., Memphis, Tenn.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Elec. Mfg. Co., Div., Joshua Hendy Iron Works, Ampere, N. J.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hertner Electric Co., The, Cleveland, O.
Holtzer-Cabot Div. The Leland Electric Co., Dayton, O.
Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Jackson Co., Byron, Los Angeles, Calif. (Submersible)

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Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Lima Electric Motor Co., Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
● Moore Co., The, Kansas City, Mo., (slow speed fan motors)
Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Robbins & Myers, Inc., Springfield, O.
Smith Corp., A. O., Milwaukee, Wis.
Star Electric Motor Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
● Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whirlaway Motors, Inc., Tipp City, O.

MUSHROOM VENTILATORS

See Ventilators, Mushroom

NEEDLE BEARINGS

See Bearings, Needle

NEEDLE VALVES

See Valves, Needle

NEUTRALIZERS, ACID

See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR

See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS

See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS

See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Cicero, Ill.
● Crane Co., Chicago, Ill.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Star Tubular Products Co., Chicago, Ill.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., Cleveland, O.

NIPPLES, PIPE, FLEXIBLE

● Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.
Davis Engineering Corp., Elizabeth, N. J.

NIPPLES, PIPE, IRON AND STEEL

Alabama Pipe Co., Anniston, Ala. (Cast iron)
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa. (Swage)
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Larkin Packer Co., St. Louis, Mo.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Star Tubular Products Co., Chicago, Ill.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Watson-Stillman Co., Roselle, N. J.
Wheeling Machine Products Co., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., Hillside, N. J.
International Nickel Co., Inc., The, New York, N. Y.

NIPPLES, RADIATOR, SLIP AND SCREW

Plumb Mfg. Co., Utica, N. Y.

NOISE ELIMINATORS

See Bases and Pads, Vibration Isolating; Hose, Metal and Fittings; Insulation, Sound Deadening

NOZZLES, ATOMIZING

Bahnson Co., Winston-Salem, N. C.
Benjamin Air Rifle Co., St. Louis, Mo.
Binks Mfg. Co., Chicago, Ill.
Delavan Engineering Co., Des Moines, Ia.
● Maid-O'-Mist, Inc., Chicago, Ill.
● Marley Co., Inc., The, Kansas City, Mo.
● Martocello & Co., Jos. A., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Supreme Electric Products Corp., Rochester, N. Y.

NOZZLES, FLOODING

● Marley Co., Inc., The, Kansas City, Mo.

NOZZLES, SPARGER, FOR TANK HEATING

Schutte & Koerting Co., Philadelphia, Pa.

NOZZLES, SPRAY

American Cooling Tower Co., Kansas City, Mo.
American Molded Products Co., Chicago, Ill.
April Showers Co., Inc., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Blower Application Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Chain Belt Co., Milwaukee, Wis.
● Clarage Fan Co., Kalamazoo, Mich.
Delavan Engineering Co., Des Moines, Ia.
Dustlix Corp., Milwaukee, Wis.
Eclipse Air Brush Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Fluor Corp., Ltd., The, Los Angeles, Calif.
● Grinnell Co., Inc., Providence, R. I.
International Moistening Co., Providence, R. I.
Link-Belt Co., Chicago, Ill.
● Maid-O'-Mist, Inc., Chicago, Ill.
● Marley Co., Inc., The, Kansas City, Kans.
● Martocello & Co., Jos. A., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Plummer Spray Equipment Co., Napoleon, O.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Supreme Electric Products Corp., Rochester, N. Y.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
● Yarnall-Waring Co., Philadelphia, Pa.

NUTS, LOCK

Chase Brass & Copper Co., Waterbury, Conn.
● Crane Co., Chicago, Ill.
Dzus Fastener Co., Inc., Babylon, N. Y.
Elastic Stop Nut Corp. of America, Union, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● Grinnell Co., Inc., Providence, R. I.
Industrial Screw Co., Chicago, Ill.
Kwikon Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Locknut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Palnut Co., Irvington, N. J.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
SKF Industries, Inc., Philadelphia, Pa.
Shakeproof, Inc., Chicago, Ill. (Lock washers)

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- Standard Pressed Steel Co., Jenkintown, Pa.
- Swallow Airplane Co., Wichita, Kan.
- Tinnerman Products, Inc., Cleveland, O.
- ● Walworth Co., New York, N. Y.
- Ward Foundries. Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observation, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL FIRED UNIT HEATERS

See Heaters, Unit, Oil Fired

OIL SEPARATORS

See Separators, Steam and Oil

OPERATORS, DAMPER, DUCT

- Arens Controls, Inc., Chicago, Ill.
- ● Autempco Corp., New York, N. Y.
- ● Automatic Products Co., Milwaukee, Wis.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- ● Barber-Colman Co., Rockford, Ill.
- Bristol Co., The, Waterbury, Conn.
- Brooke Engineering Co., Inc., Philadelphia, Pa.
- Conoflow Corp., Philadelphia, Pa.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- ● General Controls Co., Glendale, Calif.
- Hotstream Heater Co., Cleveland, O.
- ● Johnson Service Co., Milwaukee, Wis.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Mason-Neilan Regulator Co., Boston, Mass.
- ● Mercoid Corp., The, Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Perfex Corp., Milwaukee, Wis.
- ● Powers Regulator Co., Chicago, Ill.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- Young Regulator Co., Cleveland, O.

OPERATORS, VALVE

- ● Autempco Corp., New York, N. Y.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- ● Barber-Colman Co., Rockford, Ill.
- Bristol Co., The, Waterbury, Conn.
- Brooke Engineering Co., Inc., Philadelphia, Pa.
- Conoflow Corp., Philadelphia, Pa.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- Foxboro Co., Foxboro, Mass.
- ● General Controls Co., Glendale, Calif.
- Grove Regulator Co., Oakland, Calif.
- Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
- ● Johnson Service Co., Milwaukee, Wis.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Mason-Neilan Regulator Co., Boston, Mass.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Perfex Corp., Milwaukee, Wis.
- Philadelphia Gear Works, Inc., Philadelphia, Pa.
- ● Powers Regulator Co., Chicago, Ill.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, RADIATOR

- Armstrong Control Co., Inc., Portland, Ore.
- ● Autempco Corp., New York, N. Y.
- ● Barnes & Jones, Inc., Boston, Mass.
- Cashin Co., W. D., Boston, Mass.
- ● Dunham Co., C. A., Chicago, Ill.
- ● Illinois Engineering Co., Chicago, Ill.
- ● Johnson Service Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- New York Air Valve Corp., New York, N. Y.
- ● Sarco Co., Inc., New York, N. Y.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Tallmadge & Co., Webster, East Orange, N. J.
- ● Thrush & Co., H. A., Peru, Ind.

OXY-ACETYLENE WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

OXYGEN RECORDERS

See Recorders, Oxygen

OZONE APPARATUS

- A & J Co., Chicago, Ill.
- Coroaire Heater Corp., The, Cleveland, O.
- Electroaire Corp., Chicago, Ill.
- General Ozone Corp., Chicago, Ill.
- Montgomery Bros., San Francisco, Calif.
- Ozone Air Co., Grand Rapids, Mich.
- United States Ozone Co. of America, Scottdale, Pa.
- Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa

PACKAGED HEAT PUMP UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

PACKAGED STEAM GENERATORS

See Boilers, Steam Generating Units, Heating and Process

PACKING, ASBESTOS

- Acme Asbestos Covering & Flooring Co., Chicago, Ill.
- Allpax Co., Inc., Mamaroneck, N. Y.
- Anchor Packing Co., Philadelphia, Pa.
- Austin-Mason Co., New York, N. Y.
- Belmont Packing & Rubber Co., The, Philadelphia, Pa.
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
- Chicago Specialty Mfg. Co., Chicago, Ill.
- Crane Packing Co., Chicago, Ill.
- Darcoid Co., Inc., New York, N. Y.
- Durabla Mfg. Co., New York, N. Y.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Felt Products Mfg. Co., Chicago, Ill.
- Garlock Packing Co., Palmyra, N. Y.
- Gatke Corp., Chicago, Ill.
- Goodyear Tire & Rubber Co., Akron, O.
- Greene, Tweed & Co., North Wales, Pa.
- Johns-Manville, New York, N. Y.
- Keasbey Co., Robert A., New York, N. Y.
- Keasbey & Mattison Co., Ambler, Pa.
- Klingerit, Inc., New York, N. Y. (Sheet and rod)
- Linear Incorporated, Philadelphia, Pa.
- Metallo Gasket Co., New Brunswick, N. J.
- Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
- Q-P Mfg. Co., Needham Heights, Mass.
- Quaker Rubber Corp., Philadelphia, Pa.
- Raybestos-Manhattan, Inc., Passaic, N. J.
- Sall Mountain Co., Chicago, Ill.
- Union Asbestos & Rubber Co., Cicero, Ill.
- United States Rubber Co., New York, N. Y.
- ● Wilson, Inc., Grant, Chicago, Ill.

PACKING, FIBER

- American Felt Co., Glenville, Conn.
- Anchor Packing Co., Philadelphia, Pa.
- Armstrong Cork Co., Lancaster, Pa.
- Austin-Mason Co., New York, N. Y.
- Belmont Packing & Rubber Co.. The, Philadelphia, Pa.
- Darcoid Co., Inc., New York, N. Y.
- Durabla Mfg. Co., New York, N. Y.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Endura Mfg. Corp., Quakertown, Pa.
- Garlock Packing Co., Palmyra, N. Y.
- Greene, Tweed & Co., North Wales, Pa.
- Johns-Manville, New York, N. Y.
- Keasbey Co., Robert A., New York, N. Y.
- Linear Incorporated, Philadelphia, Pa.
- McQuay-Norris Mfg. Co., St. Louis, Mo.
- Metallo Gasket Co., New Brunswick, N. J.
- Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
- Products Research Co., Los Angeles, Calif.
- Quaker Rubber Corp., Philadelphia, Pa.
- Raybestos-Manhattan, Inc., Passaic, N. J.
- Union Asbestos & Rubber Co., Cicero, Ill.
- United States Rubber Co., New York, N. Y.

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PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Anchor Packing Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chicago Belting Co., Chicago, Ill.
Davies & Co., Wayne, Westboro, Mass.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Graton & Knight, Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.
Wayne Davies & Co., Worcester, Mass.
Williams & Son, I. B., Dover, N. H.

PACKING, METALLIC

Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
France Packing Co., Tacony, Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Hound Packing Co., Chicago, Ill.
Johns-Manville, New York, N. Y.
Klingerit, Inc., New York, N. Y. (Sheet & rod)
Linear Incorporated, Philadelphia, Pa.
McQuay-Norris Mfg. Co., St. Louis, Mo.
National Engineering Products, Inc., Washington, D. C.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.

PACKING, RUBBER AND SYNTHETIC

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Arrowhead Rubber Co., Los Angeles, Calif.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Chicago Belting Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Greene, Tweed & Co., North Wales, Pa.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Houghton & Co., E. F., Philadelphia, Pa.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

PANELS, PERFORATED, FOR AIR DIFFUSION

● Pyle-National Co., The, Chicago, Ill.
Simplex Ceiling Co., New York, N. Y.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
American Welding & Mfg. Co., Warren, O.
Camloc Fastener Corp., New York, N. Y. (Fasteners for access panels and sheet metal)
Carey Mfg. Co., The, Philip, Lockland, Cincinnati, O. (Insulating panel for housing and duct construction)
Commercial Shearing & Stamping Co., Youngstown, O. (Tank heads and bottoms, water heater legs, furnace stampings, etc.)
Detroit Stamping Co., Detroit, Mich.
Dover Metal Products Co., The, Canal Fulton, O.
Falstrom Co., Passaic, N. J. (Air conditioning cabinets, steel control panels)
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Lindsay Corp., The, Melrose Park, Ill. (Cabinet construction for air conditioning and warm air heating equipment)
Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
Rigid-Tex Corp., Buffalo, N. Y.

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PIPE, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
Colonial Alloy Co., Metals Div., Philadelphia, Pa.
● Revere Copper & Brass, Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.

PIPE, ASBESTOS FIBER AND CEMENT

Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
United States Stoneware Co., New York, N. Y.

PIPE BENDERS

See Benders, Pipe

PIPE, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
● Hussey & Co., C. G., Pittsburgh, Pa.
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., New York, N. Y.
● Revere Copper and Brass., Incorporated, New York, N. Y.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Works, Somerville, N. J.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, PRESSURE, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, THREADED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Wks., Somerville, N. J.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

PIPE COILS

See Coils, Pipe

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PIPE COUPLINGS

See Couplings, Pipe

PIPE COVERING, ADHESIVES

See Adhesives, for Pipe Covering

PIPE CUTTERS

See Cutters

PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Brown Co., New York, N. Y.
Orangeburg Mfg. Co., Orangeburg, N. Y.

PIPE FITTINGS

See Fittings, Pipe

PIPE FLANGES

See Flanges, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Trenton, N. J.
United States Rubber Co., New York, N. Y.

PIPE INSULATION

See Insulation, Pipe

PIPE INSULATION ADHESIVES

See Adhesives, for Pipe Covering

PIPE, JACKETED

Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Fluid Systems, Inc., New Haven, Conn.
Kaiser Co., E. B., Chicago, Ill.
Nooter Boiler Works Co, John, St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
● Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., Toledo, O.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE LOCATORS

See Locators, Pipe, Underground

PIPE, LINED

American Brass Co., Waterbury, Conn. (Tin)
American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., New York, N. Y. (Rubber)
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Cement Lined Pipe Co., Lynn, Mass. (Cement)
Clow & Sons, James B., Chicago, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y. (Lead)
Gates Engineering Co., Wilmington, Del.
General Plate Div., Metals & Controls Corp., Attleboro, Mass. (Silver lined)
Goodrich Co., B. F., Akron, O. (Rubber-lined)
● Heresite & Chemical Co., Manitowoc, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Cement)
Kaiser Co., E. B., Chicago, Ill.
Knight, Maurice A., Akron, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Nooter Boiler Works Co., John, St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
United States Rubber Co., New York, N. Y. (Rubber)
United States Stoneware Co., New York, N. Y.
Vesco Corp., New York, N. Y. (Enamel)
Warren Foundry & Pipe Corp., New York, N. Y. (Cement)
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE LINE STRAINERS

See Strainers, Pipe Line

PIPE, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
● Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
● Revere Copper and Brass, Incorporated, New York, N. Y.

PIPE NIPPLES

See Nipples, Pipe

PIPE, PLASTIC

Acadia Synthetic Products, Div., Western Felt Works, Chicago, Ill.
Amerform Corp., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.
Haveg Corp., Newark, Del.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE, PRE-INSULATED

Baldwin-Hill Co., Trenton, N. J.
● Durant Insulated Pipe Co., Palo Alto, Calif.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Flexible Tubing Corp., Branford, Conn.
Kaiser Co., E. B., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.

PIPE REAMERS

See Reamers, Pipe

PIPE REPAIR CLAMPS

See Clamps, Pipe Repair

PIPE, SPIRAL, RIVETED AND WELDED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Columbian Steel Tank Co., Kansas City, Mo.
Naylor Pipe Co., Chicago, Ill.
Nikoh Tube Co., Chicago, Ill.
● Taylor Forge & Pipe Wks., Chicago, Ill.

PIPE, STEEL, ALLOY

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.

PIPE, STEEL, BUTT AND LAP WELDED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Semet-Solvay Engineering Corp., New York, N. Y. (Specially fabricated
South Chester Tube Co., Chester, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Tippett & Wood, Phillipsburgh, N. J. (12 in. and larger)
● Wheatland Tube Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Locomotive Co., Alco Products Div., New York, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Timken Roller Bearing Co., Canton, O.
● Trent Tube Mfg. Co., East Troy, Wis.

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PIPE, STONEWARE

General Ceramics & Steatite Corp., Keasbey, N. J.
Knight, Maurice A., Akron, O. (Stoneware)
United States Stoneware Co., New York, N. Y. (Stoneware)

PIPE SUPPORTS

See Hangers and Supports, Pipe

PIPE TONGS

See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE

General Ceramics & Steatite Corp., Keasbey, N. J.
National Carbon Co., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY

Alpha Metals, Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE VISES

See Vises, Pipe

PIPE, WOOD

American District Steam Co., North Tonawanda, N. Y.
Caldwell Co., W. E., Louisville, Ky.
Michigan Pipe Co., Bay City, Mich.

PIPE WRENCHES

See Wrenches, Pipe

PIPE, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PIPING IDENTIFICATION MARKERS

See Identification Markers for Piping Services

PISTON RINGS

See Rings, Piston

PITOT TUBES

See Tubes, Pitot

PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLASTIC PIPE AND PIPE FITTINGS

See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC TUBING

See Tubing, Plastic

PLATES, FLOOR AND CEILING

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
Russell Mfg. Co., John M., Naugatuck, Conn.
● Walworth Co., New York, N. Y.

PLUG COCKS

See Valves, Plug

PLUG VALVES

See Valves, Plug

PLUGS, FUSIBLE, BOILER

Chicago Specialty Mfg. Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Swift Lubricator Co., Elmira, N. Y.
● Walworth Co., New York, N. Y.

PLUGS, REPAIR, FOR TANKS

Chicago Specialty Mfg. Co., Chicago, Ill.
Rolyan Metal Products, Chicago, Ill.
U. S. Plug & Fitting Co., Cleveland, O.

POROUS METAL

See Metal, Porous

PORTS, OBSERVATION, BOILER

Chicago Fire Brick Co., Chicago, Ill.
Detroit Stoker Co., Detroit, Mich.
Green Fire Brick Co., Mexico, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Sims Co., Erie, Pa.
Springfield Boiler Co., Springfield, Ill.

POSITIONERS, WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drying Sytems, Inc., Chicago, Ill.
Engineer Co., New York, N. Y.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
● General Fittings Co., Providence, R. I.
Griscom-Russell Co., New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Industrial Engineering & Equipment Co., St. Louis, Mo. (Electric)
Johnson Corp., The, Three Rivers, Mich.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Martin-Quaid Co., Philadelphia, Pa.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Peabody Engineering Corp., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Staples & Pfeiffer, San Francisco, Calif.
Struthers Wells Corp., Titusville, Pa.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
● Whitlock Mfg. Co., Hartford, Conn.
Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)
Yula Water Heaters Inc., New York, N. Y.

PREHEATERS AND STRESS RELIEVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Martin-Quaid Co., Philadelphia, Pa.
Trent Inc., Philadelphia, Pa.

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PRESSURE CONTROLLERS

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PRESSURE REGULATORS

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PRESSURE SWITCHES

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PROCESS HEATING SYSTEMS

See Systems, Process Heating, High Temperature

PROCESS STEAM SUPERHEATERS

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PROCESS AND STORAGE TANKS

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PROPELLER PUMPS

See Pumps, Propeller

PROPORTIONING PUMPS

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PROTECTIVE COATINGS

See Coatings, Protective, for Metal

PROTECTORS, PIPE COVERING

- American District Steam Co., North Tonawanda, N. Y.
- Carpenter & Paterson, Inc., East Boston, Mass.
- Cinder Products Corp., Providence, R. I.
- ● Grinnell Co., Inc., Providence, R. I.
- ● Ric-wiL Co., Cleveland, O.

PSYCHROMETERS, MOTOR ASPIRATED

- Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
- Hill, E. Vernon, Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

PSYCHROMETERS, SLING AND HAND ASPIRATED

- American Moistening Co., Providence, R. I.
- Foxboro Co., Foxboro, Mass.
- Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
- G. M. Mfg. Co., New York, N. Y.
- General Scientific Equipment Co., Philadelphia, Pa.
- ● Grinnell Co., Inc., Providence, R. I.
- H-B Instrument Co., Philadelphia, Pa.
- Hill, E. Vernon, Chicago, Ill
- ● Johnson Service Co., Milwaukee, Wis.
- Moeller Instrument Co., Richmond Hill, N. Y.
- Palmer Thermometers, Inc., Cincinnati (Norwood), O.
- Parks-Cramer Co., Fitchburg, Mass.
- Precision Thermometer & Instrument Co., Philadelphia, Pa.
- Scientific Instrument Co., Detroit, Mich.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- Trerice Co., H. O., Detroit, Mich.
- Weksler Thermometer Corp., New York, N. Y.
- Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROSTATS

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PULLEYS AND SHEAVES, FOR BELT DRIVES

- ● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- American Pulley Co., Philadelphia, Pa.
- Browning Mfg. Co., Inc., Maysville, Ky.
- Chicago Die Casting Mfg. Co., Chicago, Ill. (v-type)
- Congress Drives Div., Tann Corp., Detroit, Mich. (V belt—fractional and multiple horsepower)
- ● Dayton Rubber Co., Dayton, O.
- Dick Co., Inc., R. & J., Passaic, N. J. (Steel split)
- Doall Co., The, Des Plaines, Ill.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Gates Rubber Co., The, Denver, Colo.
- Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
- Horton Mfg. Co., Minneapolis, Minn. (Variable speed)
- Lau Blower Co., Dayton, O.
- Lewellen Mfg. Co., Columbus, Ind.
- Lovejoy Flexible Coupling Co., Chicago, Ill.
- Maurey Mfg. Corp., Chicago, Ill. (v-belt steel and cast iron)
- Medart Co., St. Louis, Mo.
- Pyott Foundry & Machine Co., Chicago, Ill.
- Rockwood Mfg. Co., Inc., Indianapolis, Ind.
- Schnacke, Inc., Evansville, Ind. (v-type)
- Scientiae Tool Co., Dayton, O. (variable pitch)
- Sprout-Waldron & Co., Muncy, Pa.
- Swift Mfg. Co., Inc., Detroit, Mich. (Cast iron)
- Thermoid Co., Trenton, N. J.
- ● Utility Appliance Corp., Los Angeles, Calif.
- V-Belt Clutch Co., Los Angeles, Calif.
- Valley Foundry & Machine Works, Inc., Fresno, Calif.
- Webster Electric Co., Racine, Wis.
- Wood's Sons Co., T. B., Chambersburg, Pa.
- ● Worthington Pump & Machinery Corp., Harrison, N. J. (v-type

PULVERIZED COAL BURNERS

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PUMP BASES

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PUMP UNITS, FUEL OIL

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PUMP VALVES

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PUMPS, BOILER FEED

- Acker Organizations, Inc., W. M., Cleveland, O.
- Aldrich Pump Co., Allentown, Pa.
- ● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- American-Marsh Pumps, Inc., Battle Creek, Mich.
- Aurora Pump Co., Aurora, Ill.
- Austin-Mason Co., New York, N. Y.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- ● Buffalo Pumps, Inc., Buffalo, N. Y.
- ● Chicago Pump Co., Chicago, Ill.
- Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
- Columbus Steam Pump Wks., Co., Columbus, O.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Cyclotherm Corp., New York, N. Y.
- Davidson Co., M. T., Brooklyn, N. Y.
- ● Dean Brothers Pumps, Inc., Indianapolis, Ind.
- Dean Hill Pump Co., Indianapolis, Ind.
- Decatur Pump Co., Decatur, Ill.
- De Laval Steam Turbine Co., Trenton, N. J.
- Deming Co., Salem, O.
- Domestic Engine & Pump Co., Shippensburg, Pa.
- Dutton Co., C. H., Kalamazoo, Mich
- ● Eagan Co., Walter H., Philadelphia, Pa.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- ● Economy Pumps, Inc., Hamilton, O.
- Fairbanks, Morse & Co., Chicago, Ill.
- Frederick Iron & Steel Co., Frederick, Md.
- ● Gardner-Denver Co., Quincy, Ill.
- Goulds Pumps, Inc., Seneca Falls, N. Y.
- Guild & Garrison, Inc., Brooklyn, N. Y.
- ● Ingersoll-Rand Co., New York, N. Y.
- Jackson Co., Byron, Los Angeles, Calif.
- Jacuzzi Bros., Inc., Richmond, Calif.
- Johnson Corp., The, Three Rivers, Mich.
- Kingsford Foundry & Machine Wks., Oswego, N. Y.
- Kisco Boiler & Engineering Co., St. Louis, Mo.
- Lawrence Pump & Engine Co., Lawrence, Mass.
- Lecourtenay Co., Newark, N. J.
- Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O
- ● McDonnell & Miller, Inc., Chicago, Ill.
- Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
- Morris Machine Works, Baldwinsville, N. Y.
- ● Nash Engineering Co., South Norwalk, Conn.
- National Steam Pump Co., Upper Sandusky, O.
- Oberdorfer Industries, Inc., Syracuse, N. Y.
- Pacific Pumping Co., San Francisco, Calif.
- Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
- Pennsylvania Pump & Compressor Co., Easton, Pa.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Robbins & Myers, Inc., Springfield, O.
- ● Roth Co., Roy E., Rock Island, Ill.
- Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
- ● Skidmore Corp., St. Joseph, Mich.
- Sta-Rite Products, Inc., Delavan, Wis.
- ● Sterling, Inc., Milwaukee, Wis.

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Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp. Indianapolis Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CENTRIFUGAL

Aldrich Pump Co., Allentown, Pa.
Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Metal Products Co., Fort Worth, Tex.
American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Beckett & Co., Inc., Thomas, Dallas, Tex.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blaisdell Compressor Co., New York, N. Y.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., LaCrosse, Wis.
Carver Pump Co., Muscatine, Ia.
Chain Belt Co., Milwaukee, Wis.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A. Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Industries Inc., New Haven, Conn.
● Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn. N. Y.
Frederick Iron & Steel Co., Frederick, Md.
Fulflo Specialties Co., Inc., The, Blanchester, O.
● Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marco Co., Inc., Wilmington, Del.
Morey, Dan, Los Angeles, Calif. (recirculating for evaporative coolers)
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., New York, N. Y.
Oberdorfer Industries, Inc., Syracuse, N. Y.
Pacific Pumping Co., San Francisco, Calif.
Palmer Electric Co., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Schneible Co., Claude B., Detroit, Mich.
Schwitzer-Cummins Co., Indianapolis, Ind.
● Skidmore Corp., St. Joseph, Mich.
Smith Corp., A. O., Milwaukee, Wis.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.
● Sterling, Inc., Milwaukee, Wis.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
● Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
● Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Warren Steam Pump Co., Inc., Warren, Mass.
Webb Co., The, Webb City, Mo.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CONDENSATION RETURN

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Inc., Brooklyn, N. Y.
American Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
● Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A., Chicago, Ill.
Dutton Co., C. H., Kalamazoo, Mich.
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Economy Pumps, Inc., Hamilton, O.
Faber Engineering Co., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Co., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Heating Assurance, Inc., Spokane, Wash.
● Hoffman Specialty Co., Indianapolis, Ind.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Myers & Bro. Co., The F. E., Ashland, O.
● Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Industries, Inc., Syracuse, N. Y.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Pacific Pumping Co., San Francisco, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
● Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
● Sellers Engineering Co., Chicago, Ill.
● Skidmore Corp., St. Joseph, Mo.
Sta-Rite Products, Inc., Delavan, Wis.
● Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
● Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Wayne Home Equipment Co., Inc., Fort Wayne, Ind.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, DEEP WELL, TURBINE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Cook, Inc., A. D. Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
Decatur Pump Co., Decatur, Ill. (shallow well)
Deming Co., Salem, O.
● Eagan Co., Walter H.. Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Layne & Bowler, Inc., Memphis, Tenn.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Pacific Pumping Co., San Francisco, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Smith Corp., A. O., Milwaukee, Wis.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, FIRE

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.

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● Chicago Pump Co., Chicago, Ill.
Davidson Co., M. T., Brooklyn, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
● Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Co., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Layne & Bowler, Inc., Memphis, Tenn.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Industries, Inc., Syracuse, N. Y.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, HIGH PRESSURE, HYDRAULIC

Aldrich Pump Co., Allentown, Pa.
American Engineering Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Dudgeon, Inc., Richard, New York, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
National Steam Pump Co., Upper Sandusky, O.
Robbins & Myers, Inc., Springfield, O.
Roper Corp., Geo. D., Rockford, Ill.
Sta-Rite Products, Inc., Delavan, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Watson-Stillman Co., Roselle, N. J.

PUMPS, LIQUID REFRIGERANT CIRCULATING

American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brunner Mfg. Co., Utica, N. Y.
● Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T. Brooklyn, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Lewis & Co., Chas. S., St. Louis, Mo.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Roper Corp., Geo. D., Rockford, Ill.
● Roth Co., Roy E., Rock Island, Ill.
Viking Pump Co., Cedar Falls, Ia.
Vilter Mfg. Co., Milwaukee, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPELLER

American Well Works, Aurora, Ill.
● Economy Pumps, Inc., Hamilton, O.
Frederick Iron & Steel Co., Frederick, Md.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Tri-Clover Machine Co., Kenosha, Wis.
Wayne Home Equipment Co., Inc., Fort Wayne, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPORTIONING

Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Marco Co., Inc., Wilmington, Del.
Nelson Chemical Pumps, Casper, Wyo.
% Proportioneers, Inc. %, Providence, R. I.
Robbins & Myers, Inc., Springfield, O.
Roy Co., Milton, Philadelphia, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
Altens Foundry & Machine Works, Inc., Lancaster, O.
American Hard Rubber Co., New York, N. Y. (Rubber and Rubber lined)
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brunner Mfg. Co., Utica, N. Y.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Caton Co., Newark, N. J.
Columbus Steam Pump Wks., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Deming Co., Salem, O.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Duro Co., Dayton,O.
● Eagan Co., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
● Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
● Ingersoll-Rand Co., New York, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Roy Co., Milton, Philadelphia, Pa.
Sta-Rite Products, Inc., Delavan, Wis.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Watson-Stillman Co., Roselle, N. J.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, ROTARY

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
American Engineering Co., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y. (Rubber and rubber lined)
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Bump Pump Co., La Crosse, Wis.
Caton Co., Newark, N. J.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Jabsco Pump Co., Burbank, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marco Co., Inc., Wilmington, Del.
● Martocello & Co., Jos. A., Philadelphia, Pa.
May Oil Burner Corp., Baltimore, Md.
McIntyre Div., Eastern Industries, Newton, Mass.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
● Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Industries, Inc., Syracuse, N. Y.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Polo Pump Co., Polo, Ill.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
● Roth Co., Roy E., Rock Island, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.
Taber Pump Co., Buffalo, N. Y.
Trimount Rotary Power Co., Dedham, Mass.
Tuthill Pump Co., Chicago, Ill.
Viking Pump Co., Cedar Falls, Ia.
Webster Electric Co., Racine, Wis.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.

PUMPS, SEWAGE AND SLUDGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
● Chicago Pump Co., Chicago, Ill.

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Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Frederick Iron & Steel Co., Frederick, Md.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros. Inc., Richmond, Calif.
Kingsford Foundry & Machine Works, Oswego, N. Y.
● Nash Engineering Co., South Norwalk, Conn.
Pacific Pumping Co., San Francisco, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Robbins & Myers, Inc., Springfield, O.
Swaby Mfg. Co., Chicago, Ill.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
● Eagan Co., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
● Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
National Steam Pump Co., Upper Sandusky, O.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Watson-Stillman Co., Roselle, N. J.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, SUMP

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Chicago Pneumatic Tool Co., New York, N. Y.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
Duro Co., Dayton, O.
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
● Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Co., Frederick, Md.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Imperial Brass Mfg. Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
● Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Cailf.
Jackson Co., Byron, Los Angeles, Cailf.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div., Chase Brass & Copper Co., Waterbury, Conn.
Pacific Pumping Co., San Francisco, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Injector Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Piqua Machine & Mfg. Co., Piqua, O.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfiield, O.
● Roth Co., Roy E. Rock Island, Ill.
Schneible Co., Claude B., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wade Mfg. Co., Elgin, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Westco Pumps, Fairbanks, Morse & Co., St. Louis, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Automatic Typewriter Co., Chicago, Ill.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
Austin-Mason Co., New York, N. Y.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
● Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasauqua, Pa.
● Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Skidmore Corp., St. Joseph, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Trimount Rotary Power Co., Dedham, Mass.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM HEATING

American Hydrovac, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Faber Engineering Co., Philadelphia, Pa.
● Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Nash Engineering Co., South Norwalk, Conn.
Roots-Connersville, Blower Corp., Connersville, Ind.
● Skidmore Corp., St. Joseph, Mich.
● Sterling, Inc., Milwaukee, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Beach-Russ Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.

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● Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., La Crosse, Wis.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Frederick Iron & Steel Co., Frederick, Md.
● Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Jackson Co., Byron, Los Angeles, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marco Co., Inc., Wilmington, Del.
Morris Machine Wks., Baldwinsville, N. Y.
Quimby Pump Div., H.K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roy Co., Milton, Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUNCHES, SHEET METAL

Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
C-B Tool Co., Lancaster, Pa.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Wks. Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright Mfg. Co., Hartford, Conn.
International Nutyp Tool Co., Oswego, N. Y.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Reiner & Campbell Co., Inc., Elizabeth, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia, Pa.
Zeh & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

● Armstrong Machine Works, Three Rivers, Mich.
● Frick Co., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Vilter Mfg. Co., Milwaukee, Wis.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Dudgeon, Inc., Richard, New York, N. Y.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.

RADIATION, BASEBOARD, FERROUS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
● Crane Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
● Rempe Co., Chicago, Ill.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Sterling Radiator Co., Westfield, Mass.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
● Vulcan Radiator Co., Hartford, Conn.

RADIATION, BASEBOARD, NON-FERROUS

Airecon Industries, Detroit, Mich.
Minimite Co., Chicago, Ill.
● Rittling Corp., Buffalo, N. Y.
● Webster & Co., Warren, Camden, N. J.

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIANT HEATING ELECTRICAL CONDUCTORS

See Conductors, Electrical, for Radiant Heating

RADIATION, CONVECTION TYPE, FERROUS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Brown Fintube Co., The, Elyria, O.
● Murray Mfg. Co., D. J., Wausau, Wis.
● National Radiator Co., The, Johnstown, Pa.
● Rittling Corp., The, Buffalo, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Stedco Products, Kingston, Pa.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Chicago, Ill.

RADIATION, CONVECTION TYPE, NON-FERROUS

Airecon Industries, Detroit, Mich.
● Airtherm Mfg. Co., St. Louis, Mo.
American Coils Co., Newark, N. J.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Beacon-Morris Corp., Boston, Mass.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
● Dunham Co., C. A., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● G. & O. Mfg. Co., New Haven, Conn.
Kehm Corp., The, Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Minimite Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
● Nesbitt Inc., John J., Philadelphia, Pa.
Refrigeration Economics Co., Inc., Canton, O.
● Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Super Radiator Corp., Minneapolis, Minn.
● Trane Co., The, La Crosse, Wis.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.
● Young Radiator Co., Racine, Wis.
Yula Water Heaters Inc., New York, N. Y.

RADIATION, DIRECT

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Clifford Mfg. Co., Boston, Mass. (For aircraft)
Clow & Sons, James B., Chicago, Ill. (Gas fired)
Columbus Radiator Co., McKeesport, Pa.
● Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Fowler & Wolfe Radiator Co., Norristown, Pa.
● Murray Mfg. Co., D. J., Wausau, Wis.
● National Radiator Co., The, Johnstown, Pa.
● Rittling Corp., The, Buffalo, N. Y.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Michigan City, Ind.
Wilson Engineering Corp., Chicago, Ill.

RADIATION, FIN TUBE TYPE

Airecon Industries, Detroit, Mich.
American Coils Co., Newark, N. J.
Auburn Burner Co., Auburn, Ind.
Brown Electric Co., Forest Hills, N. Y.
● Fedders-Quigan Corp., Buffalo, N. Y.
Minimite Co., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
● Rittling Corp., The, Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Stedco Products, Kingston, Pa.
Sterling Radiator Co., Westfield, Mass.
● Tilco-Fin-Tubing Div., David E. Kennedy, Inc., Brooklyn, N. Y.
● Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
● Vulcan Radiator Co., Hartford, Conn.

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

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RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, ELECTRIC

Acrow, Inc., Newark, N. J.
Burnham Corp., Irvington, N. Y.
Morton-Gregory Corp., Toledo, O.

RADIATORS, GAS FIRED

Automatic Gas Equipment Co., Pittsburgh, Pa.
Brown Fintube Co., The, Elyria, O.
Clow & Sons, James B., Chicago, Ill.

RADIATORS, HUMIDIFYING

● Murray Mfg. Co., D. J., Wausau, Wis.

RATCHET WRENCHES

See Wrenches, Ratchet

REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Independent Pneumatic Tool Co., Aurora, Ill.
Mueller Co., Decatur, Ill.
Nye Tool Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Ess Instrument Co., Bergenfield, N. J.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, HUMIDITY

American Instrument Co., Silver Spring, Md.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning Maxwell & Moore, Inc., Bridgeport, Conn.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, PRESSURE

Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone Div., Eddystone, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Wheelco Instruments Co., Chicago, Ill.

RECORDERS, CARBON DIOXIDE

Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Corp., C. J., Newark, N. J.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
Moeller Instrument Co., Richmond Hill, N. Y.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, DEW POINT

Foxboro Co., Foxboro, Mass.
● Surface Combustion Corp., Toledo, O.

RECORDERS, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

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Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
H-B Instrument Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, LIQUID LEVEL

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument & Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Yarnall-Waring Co., Philadelphia, Pa.

RECORDERS, OXYGEN

Bailey Meter Co., Cleveland, O.
● Hays Corp., Michigan City, Ind.
Mine Safety Appliances Co., Pittsburgh, Pa.

RECORDERS, PRESSURE AND VACUUM

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone Div., Eddystone, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Giannini & Co., Inc., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc. Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, SMOKE DENSITY

Bailey Meter Co., Cleveland, O.
Boiler Room Equipment, Inc., New York, N. Y.
● Combustion Control Corp., Cambridge, Mass.
Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.

RECORDERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Philadelphia, Pa.
H-B Instrument Co., Philadelphia, Pa.
● Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Scientific Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc. Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Wheelco Instruments Co., Chicago, Ill.

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

REDUCERS, SPEED

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Bodine Electric Co., Chicago, Ill.
Boston Gear Wks., Inc., North Quincy, Mass.
De Laval Steam Turbine Co., Trenton, N. J.
Doall Co., The, Des Plaines, Ill.
Falk Corp., Milwaukee, Wis.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Graham Transmissions, Inc., Milwaukee, Wis.
Janette Mfg. Co., Chicago, Ill.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lima Electric Motor Co., Lima, O.
Link Belt Co., Philadelphia, Pa.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich., (Chain speed)
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Reliance Electric & Engineering Co., Cleveland, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Smith Corp., Winfield H., Springville, N. Y.
Star Electric Motor Co., Bloomfield, N. J.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.

REFRACTORIES AND REFRACTORY CEMENT

Amerform Corp., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Basic Refractories, Inc., Cleveland, O.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
General Insulating Products Co., Brooklyn, N. Y.
Green Fire Brick Co., A. P., Mexico, Mo.
Johns-Manville, New York, N. Y.
Kellogg Co., M. W., The, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
Rutland Fire Clay Co., Rutland, Vt.
S.O.S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Standard Fuel Engineering Co., Detroit, Mich.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Walsh Refractories Corp., St. Louis, Mo.
● Zonolite Co., Chicago, Ill.

● Advertisement in this issue. See Index to Advertisers, pages 411-412

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT FILTERS

See Filters, Refrigerant

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANTS

Ansul Chemical Co., Refrigeration Div. Marinette, Wis. (methyl chloride, sulphur dioxide)
Armour Ammonia Wks., Chicago, Ill. (ammonia)
Carbide and Carbon Chemicals Corp., New York, N. Y. (Butane, isobutane, propane, ethane)
Dow Chemical Co., The, Midland, Mich.
du Pont de Nemours & Co., Inc., E. I. Ammonia Dept. Wilmington, Del. (ammonia, sulphur dioxide, methyl chloride, "Freon")
du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)
Kinetic Chemicals, Inc., Wilmington, Del. ("Freon" fluorinated hydrocarbon refrigerants)
Liquid Carbonic Corp., Chicago, Ill. (carbon dioxide)
Monsanto Chemical Co., Merimac Div., Boston, Mass. (anhydrous ammonia)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (ammonia)
Pure Carbonic, Inc., New York, N. Y. (carbon dioxide)
Solvay Sales Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va., (Methyl chloride, liquid sulphur dioxide, methylene chloride)

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City,Mo.
Air Control Products, Inc., Coopersville, Mich.
● Auer Register Co., Cleveland, O.
● Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Diamond Mfg. Co.. Wyoming, Pa.
● Dole Valve Co., The, Chicago, Ill. (Thermostatic air control)
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Empire Ventilation Equipment Co., Long Island City, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
● Independent Register Co., Cleveland, O.
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Midco Register Corp., St. Paul, Minn.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Register & Grille, Mfg. Co., Brooklyn, N. Y.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
● Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Bloomfield, N. J.
● Titus Mfg. Corp., Waterloo, Ia.
Turnbull Mfg. & Dist. Co., Detroit, Mich.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Viking Mfg. Corp., Cleveland, O.
Young Regulator Co., Cleveland, O.

REGULATORS, AIR VELOCITY

● Barber-Colman Co., Rockford, Ill.
● Hays Corp., Michigan City, Ind.
● Johnson Service Co., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Taylor Instrument Companies, Rochester, N. Y.

REGULATORS, DAMPER SETS

Adams Co., The, Dubuque, Ia.
Air Control Products, Inc., Coopersville, Mich.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Automatic Products Co., Milwaukee, Wis.
● Barber-Colman Co., Rockford, Ill.
Cole-Sewell Engineering Co., St. Paul, Minn.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Detroit Lubricator Co., Detroit, Mich.
Fossum, M. H., St. Paul, Minn.
Gerett Corp., M. A., Milwaukee, Wis.
Goese Mfg. Co., Milwaukee, Wis.
Hart & Cooley Mfg. Co., Holland, Mich.
Kerentoff, G. L., Cincinnati, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Northern Weatherstrip Co., Duluth, Minn.
Ohio Products Co., Cleveland, O.
Parker-Kalon Corp., New York, N. Y.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
● Trane Co., The, LaCrosse, Wis.
United States Register Co., Battle Creek, Mich.
White-Rodgers Electric Co., St. Louis, Mo.
Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

Askania Regulator Co., Chicago, Ill.
Atlas Utilities Co., Providence, R. I.
Bailey Meter Co., Cleveland, O.
Boiler Room Equipment, Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Campbell Engineering Co., Appleton, Wis.
● Cash Co., A. W., Decatur, Ill.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Engineer Co., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Foxboro Co., Foxboro, Mass.
Fuelguard Co., Dallas, Tex.
General Blower Co., Inc., Philadelphia, Pa.
General Power Plant Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
● Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Kol-Master Corp., Oregon, Ill.
● Krueger Sentry Gauge Co., Green Bay, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Corp., C. J., Newark, N. J.
● Webster Engineering Co., Tulsa, Okla.

REGULATORS, LEVEL, LIQUID

Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co.. Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Griscom-Russell Co., The, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
● Hays Corp., Michigan City, Ind.
Johnson Corp., The, Three Rivers, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.

Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
● Penn Electric Switch Co., Goshen, Ind.
Piezo Mfg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

REGULATORS, PRESSURE, AIR

American District Steam Co., North Tonawanda, N. Y.
American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Electric Sprayit Co., The, Sheboygan, Wis.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
North Penn Co., New York, N. Y.
● Penn Electric Switch Co., Goshen, Ind.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Victor Equipment Co., San Francisco, Calif.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

REGULATORS, PRESSURE, GAS

American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Barber Gas Burner Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dockson Corp., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Fox Control & Mfg. Co., Cleveland, O.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Controls Co., Glendale, Calif.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
● Hays Corp., Michigan City, Ind.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
● Penn Electric Switch Co., Goshen, Ind.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Positive Control Co., The, Cincinnati, O.
● Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Staples & Pfeiffer, San Francisco, Calif.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

Bailey Co., Chas., M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Fisher Governor Co., Marshalltown, Ia.
● Illinois Engineering Co., Chicago, Ill .
Kainer Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Mfg. Co., Hamilton, O.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Mueller Co., Decatur, Ill.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Watts Regulator Co., Lawrence, Mass.
White-Rodgers Electric Co., St. Louis, Mo.

● Advertisement in this issue. See Index to Advertisers, pages 411-412

REGULATORS, PRESSURE, LIQUID

- Atlas Valve Co., Inc., Newark, N. J.
- Automatic Control Co., St. Paul, Minn.
- Bailey Co., Chas. M., San Francisco, Calif.
- Bailey Meter Co., Cleveland, O.
- ● Barber-Colman Co., Rockford, Ill.
- Beaton & Cadwell Mfg. Co., New Britain, Conn.
- Belfield Co., H., Philadelphia, Pa.
- Boylston Steam Specialty Co., Chicago, Ill.
- Brooke Engineering Co., Inc., Philadelphia, Pa.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- ● Cash Co., A. W., Decatur, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
- Clark Controller Co., Cleveland, O.
- Conoflow Corp., Philadelphia, Pa.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- Davis Regulator Co., Chicago, Ill.
- Defender Instrument and Regulator Co., St. Louis, Mo.
- d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
- Douglass Automatic Controls Co., South Gate, Calif.
- Electrol, Inc., Kingston, N. Y.
- Fisher Governor Co., Marshalltown, Ia.
- Foster Engineering Co., Newark, N. J.
- Foxboro Co., Foxboro, Mass.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Grove Regulator Co., Oakland, Calif.
- Hagan Corp., Pittsburgh, Pa.
- ● Hays Corp., Michigan City, Ind.
- Healy Ruff Co., St. Paul, Minn.
- ● Henry Valve Co., Chicago, Ill.
- Hubbell Corp., Chicago, Ill.
- ● Johnson Service Co., Milwaukee, Wis.
- Justus Steam Trap Co., Napanoch, N. Y.
- Keckley Co., O. C., Chicago, Ill.
- Kièley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Hamilton, O.
- Leslie Co., Lyndhurst, N. J.
- Locke Regulator Co., Salem, Mass.
- Mason-Neilan Regulator Co., Boston, Mass.
- McAlear Mfg. Co., Chicago, Ill.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- ● Mercoid Corp., The, Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Monarch Mfg. Wks., Inc., Philadelphia, Pa.
- Monitor Controller Co., The, Baltimore, Md.
- Mueller Co., Decatur, Ill.
- Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
- Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
- Norgren Co., C. A., Denver, Colo.
- ● Penn Electric Switch Co., Goshen, Ind.
- ● Powers Regulator Co., Chicago, Ill.
- R-S Products Corp., Philadelphia, Pa.
- Republic Flow Meters Co., Chicago, Ill.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Spence Engineering Co., Inc., Walden, N. Y.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- Staples & Pfeiffer, San Francisco, Calif.
- Stickle Steam Specialties Co., Indianapolis, Ind.
- ● Strong, Carlisle & Hammond Co., Cleveland, O.
- ● Swartwout Co., Cleveland, O.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- Trerice Co., H. O., Detroit, Mich.
- Tryco Products, Inc., Westfield, Mass.
- United Electric Controls Co., Watertown, Mass.
- Watson & McDaniel Co., Philadelphia, Pa.
- Watts Regulator Co., Lawrence, Mass.
- White-Rodgers Electric Co., St. Louis, Mo.
- Williams Gauge Co., The, Pittsburgh, Pa (Feed water)

REGULATORS, STATIC PRESSURE, AIR DUCT

- Bailey Co., Chas. M., San Francisco, Calif.
- ● Barber-Colman Co., Rockford, Ill.
- Bristol Co., The, Waterbury, Conn.
- ● Cash Co., A. W., Decatur, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Coral Designs, Forest Hills, N. Y.
- ● Hays Corp., Michigan City, Ind.
- Hotstream Heater Co., Cleveland, O.
- ● Johnson Service Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- ● Powers Regulator Co., Chicago, Ill.
- Shallcross Controls, Inc., Milwaukee, Wis.

REGULATORS, TEMPERATURE

- American Instrument Co., Silver Spring, Md.
- Armstrong Control Co., Inc., Portland, Ore.
- Atlas Valve Co., Inc., Newark, N. J.
- ● Autempco Corp., New York, N. Y.
- Automatic Devices Co., Chicago, Ill.
- ● Automatic Products Co., Milwaukee, Wis.
- Bailey Co., Chas. M., San Francisco, Calif.
- Bailey Meter Co., Cleveland, O.
- ● Barber-Colman Co., Rockford, Ill.
- Bristol Co., The, Waterbury, Conn.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- Burling Instrument Co., Newark, N. J.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Crise Mfg. Co., The, Columbus, O.
- Crown Controls Co., Inc., New Bremen, O.
- Defender Instrument and Regulator Co., St. Louis, Mo.
- d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
- Detroit Lubricator Co., Detroit, Mich.
- Douglass Automatic Controls Co., South Gate, Calif.
- ● Dunham Co., C. A., Chicago, Ill.
- Eastern Industries, Inc., New Haven, Conn.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
- Electrimatic, Chicago, Ill.
- Foster Engineering Co., Newark, N. J.
- Foxboro Co., Foxboro, Mass.
- Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
- ● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
- ● General Controls Co., Glendale, Calif.
- Gleason-Avery, Inc., Auburn, N. Y.
- H-B Instrument Co., Philadelphia, Pa.
- Hagan Corp., Pittsburgh, Pa.
- Hart Mfg. Co., The, Hartford, Conn.
- ● Hays Corp., Michigan City, Ind.
- Heat Timer Corp., New York, N. Y.
- ● Illinois Engineering Co., Chicago, Ill.
- ● Johnson Service Co., Milwaukee, Wis.
- Keckley Co., O. C., Chicago, Ill.
- Klipfel Mfg. Co., Hamilton, O.
- Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
- Leeds & Northrup Co., Philadelphia, Pa.
- Leslie Co., Lyndhurst, N. J.
- Locke Regulator Co., Salem, Mass.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- McAlear Mfg. Co., Chicago, Ill.
- McCorkle Co., D. H., Berkeley, Calif.
- ● Mercoid Corp., Chicago, Ill.
- Miller-Harris Instrument Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Mueller Steam Specialty Co. Inc., Long Island City, N. Y.
- ● Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- ● Powers Regulator Co., Chicago, Ill.
- Precision Thermometer & Instrument Co., Philadelphia, Pa.
- Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
- R-S Products Corp., Philadelphia, Pa.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- ● Sarco Co., Inc., New York, N. Y.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Scientific Instrument Co., Detroit, Mich.
- Spence Engineering Co., Inc., Walden, N. Y.
- Spencer Thermostat Co., Attleboro, Mass.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- ● Sterling, Inc., Milwaukee, Wis.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- Thermac Co., Los Angeles, Calif.
- Trerice Co., H. O., Detroit, Mich.
- Triplex Heating Specialty Co., Inc., Peru, Ind.
- United Electric Controls Co., Watertown, Mass.
- Vapor Heating Corp., Chicago, Ill.
- Watson & McDaniel Co., Philadelphia, Pa.
- Wheelco Instruments Co., Chicago, Ill.
- White Mfg. Co., St. Paul, Minn.
- White-Rodgers Electric Co., St. Louis, Mo.

RELAYS, ELECTRICAL

- Advance Electric and Relay Co., Los Angeles, Calif.
- ● Allen-Bradley Co., Milwaukee, Wis.
- Allied Control Co., Inc., New York, N. Y.
- American Gas Accumulator Co., Elizabeth, N. J. (time delay)
- American Instrument Co., Silver Spring, Md.
- Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
- ● Autempco Corp., New York, N. Y.
- Automatic Electric Mfg. Co., Mankato, Minn.
- Automatic Switch Co., Orange, N. J.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- B/W Controller Corp., Birmingham, Mich.
- ● Barber-Colman Co., Rockford, Ill.
- Benjamin Electric Mfg. Co., Des Plaines, Ill.
- Clark Controller Co., Cleveland, O.
- Consolidated Car Heating Co., Inc., Albany, N. Y.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cramer Co., Inc., R. W., The, Centerbrook, Conn.
- Cutler-Hammer Inc., Milwaukee, Wis.
- Davis & Co., Inc., Dean W., Kentland, Ind.
- Detroit Lubricator Co., Detroit, Mich.
- Durakool, Inc., Elkhart, Ind.
- Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
- Electro-Switch & Controls Co., Culver City, Calif.
- Ess Instrument Co., Bergenfield, N. J.

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● General Controls Co., Glendale, Calif.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Philadelphia, Pa.
Industrial Engineering Corp., Terre Haute, Ind.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
National Time & Signal Corp., Detroit, Mich.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Potter & Brumfield Sales Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Sampsel Time Control, Inc., Spring Valley, Ill.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Philadelphia, Pa.
Synchro-Start Products, Inc., Chicago, Ill.
● Thrush & Co., H. A., Peru, Ind.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Wallace & Tiernan Co., Inc., Newark, N. J.
● Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Economy Valve Seat Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Leavitt Machine Co., Orange, Mass.
Skinner Co., M. B., South Bend, Ind.
Standard Reseater Corp., New York, N. Y.

REVERSE REFRIGERATION CYCLE UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

RINGS, PISTON, FOR COMPRESSORS

McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Corp., Hagerstown, Ind.
Piston Ring Div., Koppers Co., Inc., Baltimore, Md.
Sealed Power Corp., Muskegon, Mich.

RINGS, WELDING

Flori Pipe Co., The, St. Louis, Mo.
● Tube Turns, Inc., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.

ROD, GAS WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp., Subsidiary, Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Crucible Steel Co. of America, New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Corp., New York, N. Y.
International Nickel Co., New York, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Milburn Co., Alexander, Baltimore, Md.
Mir-O-Col Alloy Co., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
● Revere Cooper and Brass, Incorporated, New York, N. Y.
Universal Power Corp., Cleveland, O.
Victor Equipment Co., San Francisco, Calif.
● Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOF COOLERS

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ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

ROOF VENTILATORS

See Ventilators, Roof

ROOM HUMIDIFIERS

See Humidifiers, Unit, Room Type; and Units, Air Conditioning, Winter

ROOM THERMOSTATS

See Thermostats, Room or Wall

ROTARY PUMPS

See Pumps, Rotary

RUBBER BELTING

See Belting, Flat, Rubber

RUBBER PACKING

See Packing, Rubber and Synthetic

RUBBER PIPE

See Pipe, Hard Rubber

SADDLE VALVES

See Valves, Saddle

SAFETY VALVES

See Valves, Safety, Steam

SCALE REMOVAL, CHEMICAL SERVICE FOR

● Apex Engineering Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dowell Inc., Tulsa, Okla.
O'Brien Industries, Jersey City, N. J.

SCREENS, SUN REFLECTING

Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.

SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa.
American Screw Co., Providence, R. I.
Continental Screw Co., New Bedford, Mass.
● Elco Tool & Screw Corp., Rockford, Ill.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
National Lock Co., Inc., Rockford, Ill.
Parker-Kalon Corp., New York, N. Y.
Pheoll Mfg. Co., Chicago, Ill.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Shakeproof, Inc., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

SEALS, SHAFT, MECHANICAL

Chicago Seal Co., Chicago, Ill.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Johns-Manville, New York, N. Y.
Rotary Seal Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sealol Corp., Providence, R. I.
Syntron Co., Homer City, Pa.

SEAMLESS PIPE

See Pipe, Steel, Seamless

SEPARATORS, AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Binks Mfg. Co., Chicago, Ill.
Bowser, Inc., Fort Wayne, Ind.
Centrifix Corp., Cleveland, O.
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.

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● Dollinger Corp., Rochester, N. Y.
Gasflux Co., Mansfield, O.
Goodyer Industries, Inc., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
● Illinois Engineering Co., Chicago, Ill.
Johnson Corp., Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Logan Engineering Co., Chicago, Ill.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Somerville, Mass.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Textite Corp., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, FLANGE

Williams & Co., J. H., Buffalo, N. Y.

SEPARATORS, STEAM AND OIL

● Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
American District Steam Co., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and Vapor)
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
Flotrol Systems, Inc., Tulsa, Okla.
● Frick Co., Waynesboro, Pa.
Goodyer Industries, Inc., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
● Illinois Engineering Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
McAlear Mfg. Co., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Temprite Products Corp., Detroit, Mich.
Textite Corp., Chicago, Ill.
Thermix Corp., The, Greenwich, Conn.
Wabash Mfg. Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
Wright-Austin Co., Detroit, Mich.

SEWAGE EJECTORS

See Ejectors, Sewage

SEWAGE PUMPS

See Pumps, Sewage

SHAFT SEALS, MECHANICAL

See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL

Arens Controls, Inc., Chicago, Ill.
Mall Tool Co., Chicago, Ill.
Stow Mfg. Co., Binghamton, N. Y.

SHEARS, ELECTRIC, PORTABLE

● Black & Decker Mfg. Co., Towson, Md.
C-B Tool Co., Lancaster, Pa.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Independent Pneumatic Tool Co., Aurora, Ill.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Skilsaw, Inc., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Van Dorn Electric Tool Co., Towson, Md.

SHEARS, POWER

Barth Mfg. Co., Milldale, Conn.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
Buckeye Tools Corp., Dayton, O.
● Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Cleveland Tramrail Div., Cleveland Crane & Eng. Co., Wickliffe, O.
Diamond Machine Tool Co., Los Angeles, Calif.
Dreis Co., Ltd., Edward J., San Carlos, Calif.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Famco Machine Co., Racine, Wis.
Frederick Iron & Steel Co., Frederick, Md.
H-A Mfg. Co., York, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore, Beloit, Wis.
Kling Bros. Engineering Works, Chicago, Ill.
Libert Machine Co., Green Bay, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
St. Louis Tool Co., St. Louis, Mo.
Streine Tool & Mfg. Co., New Bremen, O.
Whitney Metal Tool Co., Rockford, Ill.
Wysong & Miles, Greensboro, N. C.
Whiting Corp., Harvey, Ill.

SHEARS AND SNIPS, HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Shear Mfg. Co., Chicago, Ill.
Bremil Mfg. Co., Erie, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Crescent Tool Co., Jamestown, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G. D. S. Machine & Supply Co., Inc., New York, N. Y.
Grobet File Corp. of America, New York, N. Y.
Henkel-Clauss Co., The, Fremont, O.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt. (Angle)
Klenk's Aviation Snips, Wilmington, Del.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Snap-on Tools Corp., Kenosha, Wis.
Viking Shear Co., Erie, Pa.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEAVES

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SHEET METAL BRAKES

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SHEET METAL DUCTS

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SHEET METAL FITTINGS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL PUNCHES

See Punches, Sheet Metal

SHEETS, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Fairmont Aluminum Co., Fairmont, W. Va.
Permanente Products Co., Oakland, Calif.
Reynolds Metals Co., Louisville, Ky.

SHEETS, ALUMINUM COATED

Armco Steel Corp., Middletown, O.

SHEETS AND BOARD, NON-METALLIC, FOR DUCT CONSTRUCTION

Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Keystone Asphalt Products Co., Chicago, Ill.
Ruberoid Co., New York, N. Y.
Sall Mountain Co., Chicago, Ill.
Technical Ply-Woods, Chicago, Ill.
United States Gypsum Co., Chicago, Ill.
● Wilson, Inc., Grant, Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
Armco Steel Corp., Middletown, O.
Gates Rubber Co., The, Denver, Colo.

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Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill. (Stainless)
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
● Revere Copper & Brass, Inc., New York, N. Y.

SHEETS, COPPER

American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
● Hussey & Co., C. G., Pittsburgh, Pa.
New Haven Copper Co., Seymour, Conn.
● Revere Copper and Brass, Inc., New York, N. Y.
● Weirton Steel Co., Weirton, W. Va.
Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill. (Brass, bronze, phosphor bronze)

SHEETS, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Continental Steel Corp., Kokomo, Ind. (Coated)
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Illinois Zinc Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Wks., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
● Weirton Steel Co., Weirton, W. Va. (Alloy coated)

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., The, Midland, Mich.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Pittsburgh, Pa.
Cheney Flashing Co., Trenton, N. J.
Koppers Co., Inc., Bartlett Hayward Div., Baltimore, Md.
Plasteel Products Co., Washington, Pa.
Technical Ply-Woods, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
International Nickel Co., New York, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
● **Revere Copper and Brass Incorporated, New York, N. Y.**
Robertson Co., H. H., Pittsburgh, Pa.
Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill.

SHEETS, STEEL, COPPER BEARING

Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
● **Bethlehem Steel Co., Bethlehem, Pa.**
● **Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.**
● **Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.**
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md. (Chromium, nickel, copper, iron alloy)
Newport Rolling Mill Co., Div. of International Detrola Corp., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
● **Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.**
● **Weirton Steel Co., Weirton, W. Va.**
Wheeling Steel Corp., Wheeling, W. Va.
● **Youngstown Sheet & Tube Co., Youngstown, O.**

SHEETS, STEEL, GALVANIZED

Armco Steel Corp., Middletown, O.
Apollo Steel Co., Apollo, Pa.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
● **Bethlehem Steel Co., Bethlehem, Pa.**
● **Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.**
● Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Empire Sheet & Tin Plate Co., Mansfield, O.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Newport Rolling Mill Co., Div. of International Detrola Corp., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
● **Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.**
● **Weirton Steel Co., Weirton, W. Va.**
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, STEEL, GALVANNEALED

Berger Mfg. Div., Republic Steel Corp., Canton, O.
● **Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.**
Continental Steel Corp., Kokomo, Ind.
Newport Rolling Mill Co., Div. of International Detrola Corp., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Armco Steel Corp., Middletown, O.
● **Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.**
Crucible Steel Co. of America, New York, N. Y.
Eastern Stainless Steel Corp., Baltimore, Md.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
● **Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.**
Universal Cyclops Steel Corp., Bridgeville, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York, N. Y.

SHUTTERS

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SIGHT GLASSES

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SIGNALS, LIQUID LEVEL

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SLEEVE BEARINGS

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SLEEVES, PIPE REPAIR

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SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

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SMOKE ALARMS

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SMOKE GUNS

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SMUDGE POTS

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SOFTENERS, WATER

Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Bogue Electric Co., Paterson, N. J.
Duro Co., Dayton, O.
Elgin Softener Corp., Elgin, Ill.
Cochrane Corp., Philadelphia, Pa.
Liquid Conditioning Corp., Linden, N. J.
MacDermid Chemical Co., Bristol, Conn.
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Refinite Corp., Omaha, Neb.
● Research Products Corp., Madison, Wis.
Sta-Rite Products, Inc., Delavan, Wis.
Uniflow Mfg. Co., Erie, Pa.
Warlo Corp., New York, N. Y.
Wayne Home Equipment Co., Inc., Fort Wayne, Ind.
Whitewater Products Inc., Chicago, Ill.

SOLAR HEAT RESISTING SCREENS

See Screens, Sun Reflecting

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allen Co., Inc., L. B., Chicago, Ill.
Atkins & Co., E. C., Indianapolis, Ind.
Baker & Co., Inc., Newark, N. J.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Chicago, Ill.
Eutectic Welding Alloys Corp., New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.
Hardy, Inc., Charles, New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Mueller Brass Co., Port Huron, Mich.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Wabash Mfg. Co., Chicago, Ill.

SOLDER (TIN-LEAD), AND FLUXES

Air Reduction Sales Co., New York, N. Y.
Allen Co., Inc., L. B., Chicago, Ill.
Alpha Metals, Inc., Brooklyn, N. Y.
Alsoco Corp., New York, N. Y. (Aluminum solder)
American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y.
Burnley Battery & Mfg. Co., North East, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Eutectic Welding Alloys Corp., New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Galv-Weld Products, Dayton, O.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Co., Lloyd S., Chicago, Ill.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lake Chemical Co., Chicago, Ill.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Powder Weld Process Co., The, Brooklyn, N. Y.
Rochester Lead Works, Inc., Rochester, N. Y.
Ruby Chemical Co., Columbus, O.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

● Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
● Barber-Colman Co., Rockford, Ill.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis & Co., Inc., Dean W., Kentland, Ind.
Essex Wire Corp., Div. of, Detroit, Mich.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Jefferson Electric Co., Bellwood, Ill.
National Acme Co., The, Cleveland, O.
Soreng Mfg. Co., Chicago, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Trombetta Solenoid Co., Milwaukee, Wis.
West Coast Electrical Mfg. Co., Los Angeles, Calif.

SOLENOID VALVES

See Valves, Solenoid

SOOT BLOWERS

See Blowers, Soot

SOOT DESTROYERS

See Destroyers, Soot, Chemical

SOUND DEADENING FOR CEILING AND WALL

See Insulation, Ceiling and Wall, Sound Deadening

SOUND DEADENING FOR DUCTS

See Insulation, Duct, Sound Deadening

SOUND INDICATORS

See Indicators, Sound Level

SPARGER NOZZLES

See Nozzles, Sparger, for Tank Heating

SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical

SPEED REDUCERS

See Reducers, Speed

SPIRAL PIPE

See Pipe, Spiral, Riveted and Welded

SPOT WELDERS

See Welders, Spot

SPRAY HUMIDIFIERS

See Humidifiers, Direct, Spray Head

SPRAY NOZZLES

See Nozzles, Spray

SPRAY PAINTING BOOTHS

See Booths, Painting, Spray

SPRINKLER HEADS

See Heads, Sprinkler

SPRINKLER SYSTEM CONTROLS

See Controls, Fire Protection Sprinkler Systems; Valves, Fire Protection Sprinkler System Control

STAINLESS STEEL PIPE

See Pipe, Steel, Stainless

STAINLESS STEEL SHEETS

See Sheets, Steel, Stainless

STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Crown Die & Tool Co., Chicago, Ill.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool Co., Chicago, Ill.
● Ridge Tool Co., Elyria, O.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y.

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STARTERS, MOTOR

See Controllers and Starters, Motor

STEAM BOOSTER COMPRESSORS

See Compressors, Steam Booster

STEAM ENGINES

See Engines, Steam

STEAM JET HEATERS

See Heaters, Steam Jet, for Liquids

STEAM JET REFRIGERATION

See Compressors, Refrigerating, Steam Jet

STEAM PRESSURE REGULATORS

See Valves, Pressure Reducing and Regulating

STEAM PUMPS

See Pumps, Steam

STEAM SEPARATORS

See Separators, Steam and Oil

STEAM TRAPS

See Traps, Steam

STEEL PIPE

See Pipe, Steel

STEEL TUBE FITTINGS, FLARED

See Fittings, Steel Tube, Flared

STEEL TUBING

See Tubing, Steel

STEEL UNIONS

See Unions, Steel

STEEL VALVES

See Valves, Gate; and Valves, Globe

STERILIZING LAMPS

See Lamps, Sterilizing, for Duct Installation

STERILIZING UNITS

See Units, Sterilizing, Air

STOCKS AND DIES

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Champion Blower & Forge Co., Lancaster, Pa.
Crown Die & Tool Co., Chicago, Ill. (Pipe)
Erie Tool Wks., Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., Erie, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
● Ridge Tool Co., Elyria, O.
Threadwell Tap & Die Co., Greenfield, Mass.
Toledo Pipe Threading Machine Co., Toledo, O.
V-Mac Industries, Guilford, Conn.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 to 1200 Lb per Hr

Allington & Curtis Mfg. Co., Saginaw, Mich. (For shavings, chips and sawdust)
American Coal Burner Co., Chicago, Ill.
American Engineering Co., Philadelphia, Pa.
Auburn Burner Co., Auburn, Ind.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Burke Stoker & Mfg. Co., Chicago, Ill.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Carpenter Heating & Stoker Co., Cleveland, O.
Central Rubber & Steel Corp., Findlay, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Combustion Engineering Co., Inc., New York, N. Y.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Detroit Stoker Co., Detroit, Mich.
Diamond Iron Works, Inc., Minneapolis, Minn.
Econocol Stoker Div. of Cotta Transmission Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Erie City Iron Works, Erie, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fire-King Stoker Co., Indianapolis, Ind.
Firemood Machine Wks., Converse, Ind.
Flynn & Emrich Co., Baltimore, Md.
Frederick Iron & Steel Co., Frederick, Md.
Freeman Stoker Div., Illinois Iron & Bolt Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
General Machinery Co., Spokane, Wash.
Gross-Aire Mfg. Co., Overland, Mo.
Gunnite Foundries Corp., Rockford, Ill. (Screws)
Heating Assurance, Inc., Spokane, Wash.
Her-Born Engrg. & Mfg. Co., Sandusky, O.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Hoffman Combustion Engineering Co., Detroit, Mich.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
International Engineering Wks., Inc., Framingham, Mass.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston & Jennings Co., Cleveland, O.
Kingston Products Corp., Kokomo, Ind.
Kol-Master Corp., Oregon, Ill.
Laclede Stoker Co., St. Louis, Mo.
Leffel & Co., Springfield, O.
"Loyal Knight" Stokers, Inc., Belleville, Ill.
Mallory Sales Co., Dolton, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Muncie Gear Wks., Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Newcomb-Detroit Co., Detroit, Mich.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman, Inc., St. Louis, Mo.
OverSpred Stoker Co., Chicago, Ill.
Peerless Mfg. Corp., Louisville, Ky.
Perfection Grate & Stoker Co., Springfield, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., Cleveland, O.
Rheem Mfg. Co., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sinker-Davis Co., Indianapolis, Ind.
Steel Products Engineering Co., Springfield, O.
Stokol Stoker, Indianapolis, Ind.
Sun-Fire Stoker Corp., New Albany, Ind.
Thermal Engineering Co., Chicago, Ill.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
U. S. Machine Corp., Lebanon, Ind.
Whiting Fire Power Products Corp., Superior, Wis.
Whitty Co., Inc., Boston, Mass.
Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

● Alco Valve Co., St. Louis, Mo.
Altens Foundry & Machine Works, Inc., Lancaster, O.
American District Steam Co., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Andale Co., Philadelphia, Pa.
● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Wks., Three Rivers, Mich.
● Barnes & Jones, Inc., Boston, Mass.
Barrett, Haentjens & Co., Hazleton, Pa.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Boylston Steam Specialty Co., Chicago, Ill.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cashin Co., W. D., Boston, Mass.
Caton Co., Newark, N. J.
Clark Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cuno Engineering Corp., Meriden, Conn.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Edward Valves, Inc., East Chicago, Ind.
Electrimatic, Chicago, Ill.
Elliott Co., Jeannette, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foster Pump Works, Inc., Brooklyn, N. Y.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.

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Hays Mfg. Co., Erie, Pa.
● Henry Valve Co., Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., North Bergen, N. J.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Leslie Co., Lyndhurst, N. J.
● Maid-O'-Mist, Inc., Chicago, Ill.
Manufacturers Fin Coil Co., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarco Co., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Sheffler-Gross Co., Philadelphia, Pa.
Spence Engineering Co., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Staples & Pfeiffer, San Francisco, Calif.
● Sterling, Inc., Milwaukee, Wis.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Rotary Power Co., Dedham, Mass.
Tryco Products, Inc., Westfield, Mass.
● Walworth Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.
Webster Electric Co., Racine, Wis. (For oil burners)
Williams Valve Co., D. T., Cincinnati, O.
Winslow Engineering Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD WELDERS

See Welders, Stud

SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

See Pumps, Sump

SUPERHEATERS, PROCESS STEAM

Babcock & Wilcox Co., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering Co., Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Ewing Mfg. Co., Oklahoma City, Okla.
Foster Wheeler Corp., New York, N. Y.
Goodyer Industries, Inc., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Springfield Boiler Co., Springfield, Ill.

SURFACE, FINNED, COOLING, BRINE

● Acme Industries, Inc., Jackson, Mich.
● Aerofin Corp., Syracuse, N. Y.
● American Blower Corp., Detroit, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc, Los Angeles, Calif.
● G. & O. Mfg. Co., New Haven, Conn.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

SURFACE, FINNED, COOLING, COLD WATER

● Acme Industries, Inc., Jackson, Mich.
● Aerofin Corp., Syracuse, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
● G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Wing Mfg. Co., L. J., New York, N. Y.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

● Acme Industries, Inc., Jackson, Mich.
● Aerofin Corp., Syracuse, N. Y.

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Airtemp Div. of Chrysler Corp., Dayton, O.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Betz Corp., Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
● G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Merchant & Evans Co., Philadelphia, Pa.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● G. & O. Mfg. Co., New Haven, Conn.
Goodyer Industries, Inc., Chicago, Ill.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● National Radiator Co., The, Johnstown, Pa.
● New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rigidbilt Inc., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Vulcan Radiator Co., Hartford, Conn.

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

● Aerofin Corp., Syracuse, N. Y.
● Airtherm Mfg. Co., St. Louis, Mo.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
● G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Goodyer Industries, Inc., Chicago, Ill.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
● Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Vulcan Radiator Co., Hartford, Conn.
● Wing Mfg. Co., L. J., New York, N. Y.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

Acro Electric Co., Cleveland, O.
Adam Electric Co., Frank, St. Louis, Mo.
Aerotec Corp., The, Greenwich, Conn.
● Allen-Bradley Co., Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Switch Co., Orange, N. J.
● Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Congress Fan & Electric Co., Daytona Beach, Fla.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Delta-Star Electric Co., Chicago, Ill.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Switch & Controls Co., Culver City, Calif.
● General Controls Co., Glendale, Calif.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., Hartford, Conn.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Micro Switch Div. of First Industrial Corp., Freeport, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
Morse-Smith-Morse, Inc., Watertown, Mass.
National Acme Co., The, Cleveland, O.
● Penn Electric Switch Co., Goshen, Ind.
Soreng Mfg. Co., Chicago, Ill.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Philadelphia, Pa.
Thermix Corp., The, Greenwich, Conn.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Walton Co., Hartford, Conn. (Foot)
● Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

● Alco Valve Co., St. Louis, Mo.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
● Frick Co., Waynesboro, Pa.
Magnetrol, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.

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Square D Co., Industrial Controller Div., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.

SWITCHES, FLOW

Cooper Co., Clark, Palmyra, N. J.
Drying Systems, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
● General Controls Co., Glendale, Calif.
Magnetrol, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Thermix Corp., The, Greenwich, Conn.

SWITCHES, LIQUID LEVEL

● Alco Valve Co., St. Louis, Mo.
● Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Bennett Oil Co., Omaha, Neb.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Lubricator Co., Detroit, Mich.
General Controls Co., Glendale, Calif.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
● Penn Electric Switch Co., Goshen, Ind.
Photoswitch, Inc., Cambridge, Mass.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Thermix Corp., The, Greenwich, Conn.
United Cinephone Corp., Torrington, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, MERCURY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
● Mercoid Corp., Chicago, Ill.
Mercontrol Inc., New York, N. Y.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Potter & Brumfield Sales Co., Chicago, Ill.

SWITCHES, PRESSURE AND VACUUM

Aerotec Corp., The, Greenwich, Conn.
● Allen-Bradley Co., Milwaukee, Wis.
● Autempco Corp., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
● Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Lubricator Co., Detroit, Mich.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Giannini Co., Inc., G. M., Pasadena, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Meletron Corp., Los Angeles, Calif.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Sampsel Time Control, Inc., Spring Valley, Ill.
Saval Inc., Los Angeles, Calif.
Shallcross Controls, Inc., Milwaukee, Wis.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.
Vapor Heating Corp., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.

SWITCHES, TIME

● Allen-Bradley Co., Milwaukee, Wis.
American Gas Accumulator Co., Elizabeth, N. J.
● Autempco Corp., New York, N. Y.
Automatic Devices Co., Chicago, Ill.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Electro-Switch & Controls Co., Culver City, Calif.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
Healy Ruff Co., St. Paul, Minn.
Heat Timer Corp., New York, N. Y.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
International Register Co., Chicago, Ill.
Landis & Gyr, Inc., New York, N. Y.
● Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Time & Signal Corp., Detroit, Mich.
Paragon Electric Co., Two Rivers, Wis.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Photoswitch, Inc., Cambridge, Mass.
Potter & Brumfield Sales Co., Chicago, Ill.
Reliance Automatic Lighting Co., Racine, Wis.
Reynolds Electric Co., Chicago, Ill.
Rhodes, Inc., M. H., Hartford, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sangamo Electric Co., Springfield, Ill.
Telechron, Inc., Ashland, Mass.
Tork Clock Co., Inc., Mount Vernon, N. Y.
● Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWIVEL PIPE COUPLINGS

See Joints, Pipe, Flexible Swing and Revolving

SYSTEMS, COMBUSTION CONTROL

Askania Regulator Co., Chicago, Ill.
Bailey Meter Co., Cleveland, O.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
● Combustion Control Corp., Cambridge, Mass.
Defender Instrument & Regulator Co., St. Louis, Mo.
Engineer Co., New York, N. Y.
Ess Instrument Co., Bergenfield, N. J.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
General Power Plant Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
● Illinois Engineering Co., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
● Mercoid Corp., Chicago, Ill.
Perfex Corp., Milwaukee, Wis.
Republic Flow Meters Co., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.

SYSTEMS, CONDENSATE RETURN

Acker Organization, Inc., W. M., Cleveland, O.
● Barnes & Jones, Inc., Boston, Mass.
Oilux Co., Fort Wayne, Ind.
● Roth Co., Roy E., Rock Island, Ill.
Templeton Bros., Hyde Park, Mass.
Wayne Home Equipment Co., Inc., Fort Wayne, Ind.

SYSTEMS, HEATING, HOT WATER

● Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Somerville, Mass.
Gold Top Heating, Inc., Butte, Mont.
● Hoffman Specialty Co., Indianapolis, Ind.
Hook & Ackerman, Inc., New York, N. Y.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Surface Combustion Corp., Toledo, O.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A. Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Speciality Co., Inc., Peru, Ind.

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W-H Engineering Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VACUUM

Anderson Products, Inc., Cambridge, Mass.
● Barnes & Jones, Inc., Jamacia Plain, Boston, Mass.
Cashin, W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Trane Co., The, La Crosse, Wis.
● Webster & Co., Warren, Camden, N. J.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

SYSTEMS, HEATING, VAPOR

American District Steam Co., North Tonawanda, N. Y.
● Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
Cashin Co., W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Automatic Devices Co., Chicago, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
● Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
● Bell & Gossett Co., Morton Grove, Ill.
● Dunham Co., C. A., Chicago, Ill.
Gold Top Heating, Inc., Butte, Mont.
Heat Timer Corp., New York, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
W-H Engineering Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.
Wheelco Instruments Co., Chicago, Ill.
Zone-Heat Regulator Co., Garrettsville, O.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

● Air Devices, Inc., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Dow Chemical Co., The, Midland, Mich.
● Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Foster Wheeler Corp., New York, N. Y.
Goodyer Industries, Inc., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Peabody Engineering Corp., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., The, St. Louis, Mo.
● Trane Co., The, La Crosse, Wis.
Trent, Inc., Philadelphia, Pa.
Williams, Inc., F. C., Dearborn, Mich.
● Wing Mfg. Co., L. J., New York, N. Y.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

April Showers Co., Inc., Washington, D. C.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
● Marley Co., Inc., The, Kansas City, Kan.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
● Ruppright, Siegfried, Los Angeles, Calif.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

● Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Maysteel Products, Inc., Milwaukee, Wis.
Rheem Mfg. Co., New York, N. Y.
Scaife Co., Oakmont, Pa.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Wheeler Steel Corp., Wheeling, W. Va.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.

TANKS, PROCESS AND STORAGE

Aeroil Products Co., West New York, N. J.
Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Co., New York, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
American Shipbuilding Co., Cleveland, O.
Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Connery Construction Co., Philadelphia, Pa.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Day Co., The, Minneapolis, Minn.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Downingtown, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elastic Porcelain Lining Corp., Rochester, N. Y. (Tank linings)
Falstrom Co., Passaic, N. J.
Farrar & Trefts, Buffalo, N. Y.
● Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
● Frick Co., Waynesboro, Pa.
Gehri Co., Tacoma, Wash.
General Ceramics & Steatite Corp., Keasbey, N. J.
Gerstein & Cooper Co., Somerville, Mass.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Hamburg Boiler Wks., Inc., Hamburg, Pa.
Haveg Corp., Newark, Del.
Heat Transfer Products, Inc., Carbondale, Pa.
Hodge Boiler Works, Boston, Mass.
Illinois Oil Products, Inc., Rock Island, Ill.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Framingham, Mass.
● Kewanee Boiler Corp., Kewanee, Ill.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knight, Maurice A., Akron, O.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros. Inc., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Manitowoc Boiler Wks., Manitowoc, Wis.
Maysteel Products, Inc., Milwaukee, Wis.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Murray Iron Wks. Co., Burlington, Ia.
National Lead Co., New York, N. Y.
● National Metal Fabricators, Chicago, Ill.

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● National Radiator Co., The, Johnstown, Pa.
Newcomb-Detroit Co., Detroit, Mich.
Nooter Boiler Works Co., John, St. Louis, Mo.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Rheem Mfg. Co., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rosebraugh Co., W. W., Salem, Ore.
● Roth Co., Roy E., Rock Island, Ill.
Scaife Co., Oakmont, Pa.
Sims Co., Erie, Pa.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Struthers Wells Corp., Titusville, Pa.
Tippett & Wood, Phillipsburg, N. J.
Trageser Copper Wks., Inc., Maspeth, Long Island, N. Y.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vesco Corp., New York, N. Y.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Western Blower Co., Seattle, Wash.
● Whitlock Mfg. Co., Hartford, Conn.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.

TAPE, INDUSTRIAL, ADHESIVE

● Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
Minneapolis Mining & Mfg. Co., St. Paul, Minn.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Dietzgen Co., Eugene, Chicago, Ill.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, GAGE, DEAD WEIGHT

Ashton Valve Co., Cambridge, Mass.
Dillon Co., Inc., W. C., Chicago, Ill.
Grove Regulator Co., Oakland, Calif.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mansfield & Green, Cleveland, O.

THERMOMETERS, INDICATING, INDUSTRIAL

American Thermometer Co., St. Louis, Mo.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dillon Co., Inc., W. C., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Equipoise Controls, Mount Vernon, N. Y.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
● Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Instrument Associates, Inc., Brooklyn, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Co., Chicago, Ill.

THERMOMETERS, INDICATING, REMOTE-READING

Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument & Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
● Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hotstream Heater Co., Cleveland, O.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thompson Research & Mfg. Co., Davenport, Fla.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS, INDICATING, WALL

American Thermometer Co., St. Louis, Mo.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
● Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hausman Mfg. & Sales Co., Chicago, Ill. (Indicates both temperature and humidity, showing comfort zone)
Hill, E. Vernon, Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y. (Effective temperature indicator)

THERMOMETERS, KATA

G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon, Chicago, Ill.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

● Advertisement in this issue. See Index to Advertisers, pages 411-412

THERMOSTATS, DUCT TYPE

American District Telegraph Co., New York, N. Y.
Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Douglass Automatic Controls Co., South Gate, Calif.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal, Inc., Ashland, Mass.
● Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
● Sarco Co., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Stevens Mfg. Co., Inc., Mansfield, O.
Tagliabue Corp., C. J., Newark, N. J.
Tallmadge & Co., Webster, East Orange, N. J.
Thermac Co., Los Angeles, Calif.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, EFFECTIVE TEMPERATURE

● Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal, Inc., Ashland, Mass.
● General Controls Co., Glendale, Calif.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Struthers Dunn, Inc., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
Thermac Co., Los Angeles, Calif.
Thwing-Albert Instrument Co., Philadelphia, Pa.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Wilcolator Co., Elizabeth, N. J.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, RADIANT HEAT

Detroit Lubricator Co., Detroit, Mich.
● General Controls Co., Glendale, Calif.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, ROOM OR WALL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Automatic Products Co., Milwaukee, Wis.
● Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Detroit Lubricator Co., Detroit, Mich.
● Fulton Sylphon Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McCorkle Co., D. H., Berkeley, Calif.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, SURFACE

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Detroit Lubricator Co., Detroit, Mich.
Fenwal, Inc., Ashland, Mass.
● General Controls Co., Glendale, Calif.
Hart Mfg. Co., Hartford, Conn.
● Hoffman Specialty Co., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
McCorkle Co., D. H., Berkeley, Calif.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Red Spot Electric Co., Tacoma, Wash.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Struthers Dunn, Inc., Philadelphia, Pa.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Detroit Lubricator Co., Detroit, Mich.
● General Controls Co., Glendale, Calif.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Ranco, Inc., Columbus, O.
Sampsel Time Control, Inc., Spring Valley, Ill.
Tagliabue Corp., C. J., Newark, N. J.
Tallmadge & Co., Webster, East Orange, N. J.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, WEATHER COMPENSATING

● Autempco Corp., New York, N. Y.
Automatic Devices Co., Chicago, Ill.
● Barber-Colman Co., Rockford, Ill.
● Barnes & Jones, Inc., Boston, Mass.
Crown Controls Co., Inc., New Bremen, O.

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Detroit Lubricator Co., Detroit, Mich.
Heat Timer Corp., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
United Electric Controls Co., Watertown, Mass.
● Webster & Co., Warren, Camden, N. J.
White-Rodgers Electric Co., St. Louis, Mo.

TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Bernz Co., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Crescent Tool Co., Jamestown, N. Y.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
● Ingersoll-Rand Co., New York, N. Y.
International Nutyp Tool Co., Oswego, N. Y.
Interstate Sales Co., New York, N. Y. (Protractor for layout work and center-finder protractor)
● Jackson Co., Thomas M., Detroit, Mich. (air duct, heat loss, and special calculators)
Mall Tool Co., Chicago, Ill.
Mid-States Equipment Co., Chicago, Ill. (Saw gun)
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary hole saws)
Morey, Dan, Los Angeles, Calif. (soft face hammers and mallets)
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Persson Co., T. G., Bloomfield, N. J. (flange jacks)
Rawlplug Co., Inc., The, New York, N. Y. (drills for masonry)
Richmont, Inc., Los Angeles, Calif.
Rotary Concrete Drill Co., Pasadena, Calif. (Drill bits)
Schild Mfg. Co., Milwaukee, Wis.
Snap-on Tools Corp., Kenosha, Wis.
Thompson & Son Co., The Henry G., New Haven, Conn.
Three Point Industries, Chicago, Ill. (gage for determining pipe sizes)
Walton Co., Hartford, Conn. (Tap extractors)

TOOLS, FLARING, FOR TUBING

Armstrong Mfg. Co., Bridgeport, Conn.
Bonney Forge & Tool Works, Allentown, Pa
Dudgeon, Inc., Richard, New York, N. Y.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Leonard Precision Products Co., Garden Grove, Calif.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Weatherhead Co., Cleveland, O.

TORCHES, BRAZING AND SOLDERING

Aeroil Products Co., West New York, N. J.
Air Reduction Sales Co., New York, N. Y.
Atkins & Co., E. C., Indianapolis, Ind.
Bernz Co., Otto, Rochester, N. Y.
Black Mfg. Co., The, Baltimore, Md.
Borm Mfg. Co., Elgin, Ill.
Century Aircraft Co., Inglewood, Calif.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas Products Co., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Industries, Inc., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Lee Co., K. O., Aberdeen, S. D.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Mid-States Equipment Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
National Pumpless Blowtorch Co., Cleveland, O.
Powder Weld Process Co., The, Brooklyn, N. Y.
Reiner & Campbell Co., Inc., Elizabeth, N. J.
Sac Tool Mfg. Co., St. Louis, Mo.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC

American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Fluor Corp., Ltd., The, Los Angeles, Calif.
● Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
● Marley Co., Inc., Kansas City, Kan.
● New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
● Spraying Systems Co., Chicago, Ill.
Stewart Ice Machine Co., Pomona, Calif.
Thermal Industries, Indio, Calif.
● United Cooling Tower Co., Kansas City, Mo.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
● Young Radiator Co., Racine, Wis. (radiator type)

TOWERS, COOLING, MECHANICAL DRAF

American Cooling Tower Co., Kansas City, Mo.
● Baltimore Aircoil Co., Inc., Baltimore, Md.
Binks Mfg. Co., Chicago, Ill.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
● Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
● Marley Co., Inc., Kansas City, Kan.
● Marlo Coil Co., St. Louis, Mo.
● Murray Mfg. Co., D. J., Wausau, Wis.
● New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rogers Air Conditioning Div., New York, N. Y.
Thermal Industries, Indio, Calif.
● Trane Co., The, LaCrosse, Wis.
● United Cooling Tower Co., Kansas City, Mo.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.

TRANSFORMERS, ELECTRIC

● Aldrich Co., The, Wyoming, Ill.
Arjac Products Inc., Rochester, N. Y.
Armstrong Control Co., Inc., Portland, Ore.
Bogue Electric Co., Paterson, N. J.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Crown Controls Co., Inc., New Bremen, O.
Davis & Co., Inc., Dean W., Kentland, Ind.
Fluid Systems, Inc., New Haven, Conn.
● General Controls Co., Glendale, Calif.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Jefferson Electric Co., Bellwood, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Transformer Co., Linden, N. J.
Rex Welder & Engineering Co., Kansas City, Mo.
Sola Electric Co., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Super Electric Products Corp., Jersey City, N. J.
● Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis.
West Coast Electrical Mfg. Co., Los Angeles, Calif.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

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TRAPS, STEAM, MECHANICAL

Acker Organization, Inc., W. M., Cleveland, O.
American District Steam Co., North Tonawanda, N. Y.
● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
● Barnes & Jones, Inc., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Coe Mfg. Co., Painesville, O.
● Crane Co., Painesville, O.
● Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
Ellis Drier Co., C. A., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
● Haines & Co., William S., Philadelphia, Pa. (Combination float & thermostatic)
Healy Ruff Co., St. Paul, Minn.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Justus Steam Trap Co., Napanoch, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
● Sarco Co., Inc., New York, N. Y.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Squires Co., C. E., Cleveland, O.
● Sterling, Inc., Milwaukee, Wis.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Templeton Bros., Hyde Park, Mass.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Vapor Specialty Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
● Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich. (Combination)
● Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, THERMOSTATIC

American District Steam Co., North Tonawanda, N. Y.
● Barnes & Jones, Inc., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
● Dunham Co., C. A., Chicago, Ill.
● Haines & Co., William S., Philadelphia, Pa.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Swartwout Co., Cleveland, O.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

TREATMENT, FUEL OIL, TO PREVENT SLUDGE

Alrose Chemical Co., Providence, R. I.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Celco Corp., New York, N. Y.
Elraco Engineering Co., Los Angeles, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
S. O. S. Products Co., Inc., Brooklyn, N. Y.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

American Water Softener Co., Philadelphia, Pa.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
● Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
● Brown-Electro Co., Oklahoma City, Okla.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Everett, Mass.
Carbide & Carbon Chemicals Corp., New York, N. Y.
Elgin Softener Corp., Elgin, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haering & Co., Inc., D. W., Chicago, Ill.
Kenite Laboratory Inc., New York, N. Y.
Liquid Conditioning Corp., Linden, N. J.
McRay Sales Co., Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
% Proportioneers, Inc. %, Providence, R. I.
Rid-Sludge Div., Aulwood Mfg. Co., St. Paul, Minn. (vapor treatment to remove sludge from heating system)
Saverite Engineering Co., Hoboken, N. J.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Vinco Co., Inc., The, New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, TO INHIBIT CORROSION

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Cyanamid & Chemical Corp., New York, N. Y.
American K. A. T. Corp., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bogue Electric Co., Paterson, N. J.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Everett, Mass.
Carbide & Carbon Chemicals Corp., New York, N. Y.
Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Elgin Softener Corp., Elgin, Ill.
Ferro-Nil Corp., New York, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
General Ozone Corp., Chicago, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Grief, Edward C., Bogota, N. J.
Haering & Co., D. W., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
Kenite Laboratory Inc., New York, N. Y.
Liquid Conditioning Corp., Linden, N. J.
Maintenance Engineering Corp., Houston, Tex.
McRay Sales Co., Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Monsanto Chemical Co., Organic Chemicals Div., St. Louis, Mo
National Aluminate Corp., Chicago, Ill.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Jersey City, N. J.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Refinite Corp., Omaha, Nebr.
● Research Products Corp., Madison, Wis.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
Rodwell Engineering & Sales Co., Omaha, Neb.
Saverite Engineering Co., Hoboken, N. J.
Solvay Sales Corp., New York, N. Y.
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Vinco Co., Inc., The, New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Warlo Corp., New York, N. Y.
Water Refining Co., Ft. Wayne, Ind.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.
X Laboratories, Inc., New York, N. Y.

● Advertisement in this issue. See Index to Advertisers, pages 411-412

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Carolina Aniline & Extract Co., Charlotte, N. C.
Dowell Inc., Tulsa, Okla.
Haering & Co., Inc., D. W., Chicago, Ill.
Kenite Laboratory Inc., New York, N. Y.
Liquid Conditioning Corp., Linden, N. J.
McRay Sales Co., Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
Norwood Filtration Co., The, Holyoke, Mass.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Jersey City, N. J.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Refinite Corp., Omaha, Nebr.
Wallace & Tiernan Co., Inc., Newark, N. J.
Western Chemical Co., Kansas City, Mo.

TRY-COCKS, BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Williams Valve Co., D. T., Cincinnati, O.

TUBE CLEANERS

See Cleaners, Tube

TUBES, BOILER

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Scovill Mfg. Co., Waterbury, Conn.
Standard Tube Co., Detroit, Mich.

TUBES, CONDENSER

American Brass Co., Waterbury, Conn.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
● Bundy Tubing Co., Detroit, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Scovill Mfg. Co., Waterbury, Conn.
Standard Tube Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
● Wolverine Tube Div. of Calumet & Hecla Consolidated Copper Co., Detroit, Mich.
York Corp., York, Pa.

TUBES, PITOT

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hill, E. Vernon, Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.

TUBING, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
B & M Mfg. Co., East Orange, N. J.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
● Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
B & M Mfg. Co., East Orange, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Everhot Products Co., Chicago, Ill.
● Hussey & Co., C. G., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn. (Chrome plated)
Kensico Tube Co., Mt. Kisco, N. Y.
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., New York, N. Y.
● Revere Copper and Brass Incorporated, New York, N. Y.
Roberts Tube Works, Detroit, Mich.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

TUBING, BRONZE

American Brass Co., Waterbury, Conn.
B & M Mfg. Co., East Orange, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
● Revere Copper and Brass, Incorporated, New York, N. Y.

TUBING CUTTERS

See Cutters, Tubing

TUBING, DUPLEX

Bridgeport Brass Co., Bridgeport, Conn.
Pacific Tube Co., Los Angeles, Calif. (Non-ferrous to ferrous)
Republic Steel Corp., Steel & Tubes Div., Cleveland, O. (Steel and copper)

TUBING, FINNED

● Aerofin Corp., Syracuse, N. Y.
American Coils Co., Newark, N. J.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Fintube Coil Corp., Alhambra, Calif.
● G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
● McCord Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Minimite Co., Chicago, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Tenney Engineering, Inc., Newark, N. J.
● Tilco-Fin-Tubing Div., David E. Kennedy, Inc., Brooklyn, N. Y.
Vapor Heating Corp., Chicago, Ill.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich. (Aluminum, copper)

TUBING, MAGNESIUM

B & M Mfg. Co., East Orange, N. J.
Dow Chemical Co., The, Midland, Mich.

TUBING, NICKEL AND NICKEL ALLOY

Agaloy Tubing Co., Springfield, O.
B & M Mfg. Co., East Orange, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
● Bundy Tubing Co., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
● Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa
Pittsburgh Steel Co., Pittsburgh, Pa.
● Revere Copper and Brass Incorporated, New York, N. Y.
● Trent Tube Mfg. Co., East Troy, Wis.

TUBING, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Hard-Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.

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Extruded Plastics, Inc., Norwalk, Conn.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Haveg Corp., Newark, Del.
Irvington Varnish and Insulator Co., Irvington, N. J.
Mills Corp., Elmer E., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
Presstite Engineering Co., St. Louis, Mo.
Resistoflex Corp., Belleville, N. J.
Sandee Mfg. Co., Chicago, Ill.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

TUBING, SILVER CLAD AND SILVER ALLOY

General Plate Div., Metals & Controls Corp., Attleboro, Mass.

TUBING, STEEL, ALLOY, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp. Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, ALLOY, WELDED

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Duraloy Co., Scottdale, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Detroit, Mich.
● Trent Tube Mfg. Co., East Troy, Wis.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
B & M Mfg. Co., East Orange, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Standard Tube Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
● Trent Tube Mfg. Co., East Troy, Wis.

TUBING, STEEL, WELDED

Agaloy Tubing Co., Springfield, O.
Armco Steel Corp., Middletown, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
● Bundy Tubing Co., Detroit, Mich.
Everhot Products Co., Chicago, Ill.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Nikoh Tube Co., Chicago, Ill.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
South Chester Tube Co., Chester, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Detroit, Mich.
● Wheatland Tube Co., Philadelphia, Pa.
● Youngstown Sheet & Tube Co., Youngstown, O.

TURBINES, MECHANICAL DRIVE

Carling Turbine Blower Co., Worcester, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Elliott Co., Jeannette, Pa.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
● Pyle-National Co., The, Chicago, Ill.
Steam Turbine Div., Worthington Pump and Machine Corp., Wellsville, N. Y.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

ULTRASONIC DUST AND FUME COLLECTION

See Collection, Dust and Fume, Ultrasonic

UNDERGROUND PIPING

See Conduit, Underground Piping

UNDERWATER HEATERS

See Heaters, Steam Jet, for Liquids

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
King Union Co., Inc., Hillsgrove, R. I.
Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Powell Co., Wm., Cincinnati, O.
Rhode Island Fittings Co., Providence, R. I.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, MALLEABLE, BRASS SEAT

Corley Co., Inc., The, Jersey City, N. J.
● Crane Co., Chicago, Ill.
Dart Mfg. Co., E. M., Providence, R. I.
Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jefferson Union Co., Inc., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Star Mfg. Co., Inc., Providence, R. I.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, ORIFICE

Catawissa Valve & Fittings Co., Catawissa, Pa.
Conoflow Corp., Philadelphia, Pa.
Watson-Stillman Co., Roselle, N. J.

UNIONS, STEEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Capitol Mfg. & Supply Co., Columbus, O.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Champion Machine & Forging Co., Cleveland, O.

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● Crane Co., Chicago, Ill.
DAS Div. of Defiance Automatic Screw Co., Defiance, O.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
● Henry Valve Co., Chicago, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

● Air & Refrigeration Corp., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
Alton Mfg. Co., Dallas, Tex.
● American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Detroit, Mich.
Anetsberger Bros., Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.
● Baker Ice Machine Co., South Windham, Me.
Blazer, M., & Son, Passaic, N. J.
Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Howe Ice Machine Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Parks-Cramer Co., Fitchburg, Mass.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., St. Louis, Mo.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
● Surface Combustion Corp., Toledo, O.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● United States Radiator Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigeration Co., Chicago, Ill.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space conditioned, for connection to remote compressor or cold water supply, and steam or hot water

● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
Airtemp Div. of Chrysler Corp., Dayton, O.
● American Blower Corp., Detroit, Mich.
American Thermal Industries, Detroit, Mich.
● Baker Ice Machine Co., South Windham, Me.
Blazer, M., & Son, Passaic, N. J.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
● King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
Rogers Air Conditioning Div., New York, N. Y.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Stainless & Steel Products Co., St. Paul, Minn.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Temp-Control Inc., Peoria, Ill.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co. Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
● American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Detroit, Mich.
Anetsberger Bros., Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.
● Baker Ice Machine Co., Inc., South Windham, Me.
Blazer, M., & Son, Passaic, N. J.
Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
● Curtis Refrigeration Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Inc., Chicago, Ill.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co.; St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Lintern Co., Berea, O.
● Marlo Coil Co., St. Louis Mo.
● McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
● New York Blower Co., Chicago, Ill. (Make-up air units)
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
Rogers Air Conditioning Div., New York, N. Y.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Somers, Inc., H. J., Detroit, Mich.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
● Surface Combustion Corp., Toledo, O.

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Temp-Control, Inc., Peoria, Ill.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE

Drayer & Hanson, Inc., Los Angeles, Calif.
General Engineering & Mfg. Co., St. Louis, Mo.
Muncie Gear Works, Inc., Muncie, Ind.
Terra-Temp Co., Inc., Indianapolis, Ind.
Webber Engineering Corp., Indianapolis, Ind.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling by evaporation, no dehumidification

Air Equipment Co., Denver, Colo.
● Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
● American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Metal Products Co., Fort Worth, Tex.
Aqua-Mist Co., Topeka, Kans.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Bahnson Co., Winston-Salem, N. C.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kas.
Climax Machinery Co., Indianapolis, Ind.
● Comfort Products Corp., Dallas, Tex.
Drying Systems, Inc., Chicago, Ill.
Essick Mfg. Co., Los Angeles, Calif.
Farr Co., Los Angeles, Calif.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Great National Air Conditioning Corp., Oklahoma City, Okla.
International Sales Co., San Francisco, Calif.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., & Columbus, O.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Morey, Dan, Los Angeles, Calif. (mats for evaporative coolers)
Mountain States Equipment Co., Denver, Colo.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Co., Phoenix, Ariz.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Rheem Mfg. Co., New York, N. Y.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Royal Heaters Inc., Alhambra, Calif.
Steamaire Co., Cincinnati, O.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
X L Refrigerating Co., Chicago, Ill.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

Airtemp, Div. of Chrysler Corp., Dayton, O.
● Carrier Corp., Syracuse, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Giant Mfg. Co., Council Bluffs, Ia.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Nat Corp., Kansas City, Mo.
Norwin Co., Freeport, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton O.
Rinehart Inc., Richmond, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, La Crosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.

● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigeration Co., Chicago, Ill.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 3 HP

Self contained blower, coil, compressor, filter unit

Airtemp, Div. of Chrysler Corp., Dayton, O.
● Carrier Corp., Syracuse, N. Y.
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
● Fedders-Quigan Corp., Buffalo, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Ice Cooling Appliance Corp., Morrison, Ill. (Ice)
Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
Nat Corp., Kansas City, Mo.
Pacific Mfg. Co., Cleveland, O.
Philco Corp., Philadelphia, Pa.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Rinehart Inc., Richmond, Ind.
Rogers Air Conditioning Div., New York, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft. above floor

Airtemp, Div. of Chrysler Corp., Dayton, O.
American Thermal Industries, Detroit, Mich.
● Baker Ice Machine Co., Inc., South Windham, Me.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Nat Corp., Kansas City, Mo.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Rinehart Inc., Richmond, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

● Air & Refrigeration Corp., New York, N. Y.
● Aladdin Heating Corp., Oakland, Calif.
Auburn Burner Co., Auburn, Ind.
Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
● Carrier Corp., Syracuse, N. Y.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Dalzen Tool & Mfg. Co., Detroit, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kehm Corp., The, Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
Refrigeration Economics Co., Inc., Canton, O.
Reznor Mfg. Co., Mercer, Pa.
Somers, Inc., H. J., Detroit, Mich.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.

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- ● Surface Combustion Corp., Toledo, O.
- ● Trane Co., The, La Crosse, Wis.
- Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- Unified Air Conditioner Co., Duluth, Minn.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- United States Radiator Corp., Detroit, Mich.
- York Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

- ● Air & Refrigeration Corp., New York, N. Y.
- Airtemp, Div. of Chrysler Corp., Dayton, O.
- Auburn Burner Co., Auburn, Ind.
- Beacon-Morris Corp., Boston, Mass. (Custom built)
- ● Buffalo Forge Co., Buffalo, N. Y.
- ● Carrier Corp., Syracuse, N. Y.
- ● Clarage Fan Co., Kalamazoo, Mich.
- ● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Engineering & Mfg. Co., St. Louis, Mo.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Hastings Air Conditioning Co., Hastings, Neb.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Jaden Mfg. Co., Hastings, Neb.
- Johnson Co., S. T., Philadelphia, Pa.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- ● Kennard Corp., St. Louis, Mo.
- Kramer Trenton Co., Trenton, N. J.
- ● Marlo Coil Co., St. Louis, Mo.
- ● McQuay, Inc., Minneapolis, Minn.
- Nat Corp., Kansas City, Mo.
- Niagara Blower Co., New York, N. Y.
- Refrigeration Economics Co., Inc., Canton, O.
- Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
- ● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
- Temp-Control Inc., Peoria, Ill.
- ● Trane Co., The, La Crosse, Wis.
- Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- Unified Air Conditioner Co., Duluth, Minn.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- York Corp., York, Pa.

UNITS, COOLING, WINDOW TYPE

- Airtemp., Div. of Chrysler Corp., Dayton, O.
- ● Carrier Corp., Syracuse, N. Y.
- Climax Machinery Co., Indianapolis, Ind.
- ● Fedders-Quigan Corp., Buffalo, N. Y.
- Frigidaire Div., General Motors Corp., Dayton, O.
- Mitchell Mfg. Co., Chicago, Ill.
- National Engineering & Mfg. Co., Kansas City, Mo.
- National Gas Equipment Co., Inc., Terrell, Tex.
- Pacific Mfg. Co., Cleveland, O.
- Pleasantaire Corp., Washington, D. C.
- Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
- ● United States Air Conditioning Corp., Minneapolis, Minn.

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING

- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Foster Pump Wks., Inc., Brooklyn, N. Y.
- Graham Mfg. Co., Inc., New York, N. Y.
- National Airoil Burner Co., Inc., Philadelphia, Pa.
- Peabody Engineering Corp., New York, N. Y.
- Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.
- Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
- Viking Pump Co., Cedar Falls, Ia.

UNITS, STERILIZING, AIR

- Air Purification Service, Inc., Newark, N. J.
- Hanovia Chemical & Mfg. Co., Newark, N. J.
- National Air Conditioning Inc., Johnstown, Pa.

UNITS, WINDOW VENTILATOR AND FILTER

- Airgard Mfg. Co., Chicago, Ill.
- American Air Conditioning Co., Detroit, Mich.
- Circulators & Devices Mfg. Corp., New York, N. Y.
- Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
- Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Johnson Fan & Blower Corp., Chicago, Ill.
- Kaiser Co., H. S., Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Meier Electric & Machine Co., Inc., Indianapolis, Ind.
- Mellish & Murray Co., Chicago, Ill.
- Pacific Mfg. Corp., Cleveland, O.
- Reed Unit-Fans, Inc., New Orleans, La.
- Reliable Metal Engineering Co., Chicago, Ill.
- Schwitzer-Cummins Co., Indianapolis, Ind.
- Somers Inc., H. J., Detroit, Mich.
- ● Sturtevant Co., B. F., Div. of Westinghouse Electric., Boston, Mass.
- Unified Air Conditioner Co., Duluth, Minn.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- ● Utility Appliance Corp., Los Angeles, Calif.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, AIR OPERATING

- Bailey Co., Chas. M., San Francisco, Calif.
- Bristol Co., The, Waterbury, Conn.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- Clark Controller Co., Cleveland, O.
- Conoflow Corp., Philadelphia, Pa.
- Cooper Co., Clark, Palmyra, N. J.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- ● Gotham Instrument Co., Inc., New York, N. Y.
- Grove Regulator Co., Oakland, Calif.
- Hammel-Dahl Co., Providence, R. I.
- Hunt & Son, Inc., H. B., Salem, O.
- ● Illinois Engineering Co., Chicago, Ill.
- Keller Tool Co., Grand Haven, Mich.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Hamilton, O.
- Leslie Co., Lyndhurst, N. J.
- McAlear Mfg. Co., Chicago, Ill.
- Powell Co., Wm., The, Cincinnati, O.
- R-S Products Corp., Philadelphia, Pa.
- Saval, Inc., Los Angeles, Calif.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Tagliabue Corp., C. J., Newark, N. J.
- Wilson Engineering Corp., Chicago, Ill.

VALVES, ANGLE

- Alloy Steel Products Co., Linden, N. J., (Stainless steel)
- American Brass Co., Waterbury, Conn.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Belfield Co., H., Philadelphia, Pa.
- Belknap Mfg. Co., Bridgeport, Conn.
- Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
- Central Brass Mfg. Co., Cleveland, O.
- Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
- Chase Brass & Copper Co., Waterbury, Conn.
- Cleveland Brass Mfg. Co., The, Cleveland, O.
- Cooper Alloy Foundry Co., Hillside, N. J.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Detroit Brass & Malleable Wks., Detroit, Mich.
- Edward Valves, Inc., East Chicago, Ind.
- Fairbanks Co., New York, N. Y.
- Farris Engineering Corp., Palisades Park, N. J.
- ● Grinnell Co., Inc., Providence, R. I.
- Grove Regulator Co., Oakland, Calif.
- Hammel-Dahl Co., Providence, R. I.
- Hasco Valve & Machine Co., Milwaukee, Wis.
- ● Henry Valve Co., Chicago, Ill.
- Homestead Valve Mfg. Co., Coraopolis, Pa.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Jacuzzi Bros., Inc., Richmond, Calif.
- Jarecki Mfg. Co., Erie, Pa.
- ● Jenkins Bros., New York, N. Y.
- Kennedy Valve Mfg. Co., Elmira, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Klingerit, Inc., New York, N. Y.
- Kunkle Valve Co., Ft. Wayne, Ind.
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.

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Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard Rubber)
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
● Sterling, Inc., Milwaukee, Wis.
Stockham Valves & Fittings, Birmingham, Ala.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Weatherhead Co., Cleveland, O.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Detroit Lubricator Co., Detroit, Mich.
● Hammond Brass Works, Hammond, Ind.
● Hoffman Specialty Co., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Marsh Valve Co., Dunkirk, N. Y.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
● Trane Co., The, La Crosse, Wis.

VALVES, BAR STOCK

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
● Walworth Co., New York, N. Y.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, BLOW-OFF

Babcock & Wilcox Co., New York, N. Y.
Barrett Machine Co., Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edward Valves, Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Chicago, Ill.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., Cincinnati, O.
Schade Valve Co., Philadelphia, Pa.
Williams Valve Co., D. T., Cincinnati, O.
Wilson Engineering Corp., Chicago, Ill.
● Yarnall-Waring Co., Philadelphia, Pa.

VALVES, BUTTERFLY

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
● General Controls Co., Glendale, Calif.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Powell Co., Wm., The, Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Rockwell Corp., Fairfield, Conn.
Tri-Clover Machine Co., Kenosha, Wis.

VALVES, CHECK

Aeroquip Corp., Jackson, Mich.
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Hard Rubber Co., New York, N. Y. (Rubber lined)
Aminco Refrigeration Products Co., Detroit, Mich.
Amp Corp., St. Louis, Mo.
Barrett, Haentjens & Co., Hazleton, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cochrane Corp., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Electric Sprayit Co., The, Sheboygan, Wis.
Electrol, Inc., Kingston, N. Y.
Fairbanks Co., New York, N. Y.
Foster Engineering Co., Newark, N. J.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
● Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kunkle Valve Co., Fort Wayne, Ind.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mansfield & Green, Cleveland, O.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Denver, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass. (Bleeder type)
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Trenton, N. J. (Hard rubber)
● Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J. (hydraulic service)
Weatherhead Co., Cleveland, O.
White Flomatic Corp., Hoosick Falls, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Gauge Co., The, Pittsburgh, Pa. (Noiseless)
Williams Valve Co., D. T., Cincinnati, O.

VALVES, COMPRESSOR

Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Seal Co., Chicago, Ill.
Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
● Frick Co., Waynesboro, Pa.

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● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
● Ohio Injector Co., Wadsworth, O.
Voss Co., J. H. H., Inc., New York, N. Y.

VALVES, DIAPHRAGM

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foxboro Co., Foxboro, Mass.
Gates Engineering Co., Wilmington, Del.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
● Grinnell Co., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Hunt & Son, Inc., H. B., Salem, O.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Leslie Co., Lyndhurst, N. J.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● National Radiator Co., The, Johnstown, Pa.
Norgren Co., C. A., Denver, Colo.
North American Mfg. Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Penn Industrial Equipment Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. J.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
White-Rodgers Electric Co., St. Louis, Mo.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

● Barber-Colman Co., Rockford, Ill.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hodgman Mfg. Co., Taunton, Mass.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
● Ohio Injector Co., Wadsworth, O.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.

VALVES, FLOAT

● Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
Atlas Valve Co., Inc., Newark, N. J.
● Automatic Products Co., Milwaukee, Wis. (Oil)
Bailey Co., Chas. M., San Francisco, Calif.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belfield Co., H., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Caldwell Co., W. E., Louisville, Ky.
● Cash Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Lubricator Co., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Frick Co., Waynesboro, Pa.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Locke Regulator Co., Salem, Mass.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
● Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Perfex Corp., Milwaukee, Wis.
Phillips & Co., H. A., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Robert Mfg. Co., Los Angeles, Calif.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Skuttle Mfg. Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialities Co., Indianapolis, Ind.
● Swartwout Co., Cleveland, O.
Viking Air Conditioning Corp., Cleveland, O.
Watts Regulator Co., Lawrence, Mass.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

● Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Catskill Metal Works, Inc., Catskill, N. Y.
Hammel-Dahl Co., Providence, R. I.
Hook & Ackerman, Inc., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Quality Specialty Co., Inc., Philadelphia, Pa.
Sall Bros. Co., Rockford, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
W-H Engineering Co., Chicago, Ill.
White Flomatic Corp., Hoosick Falls, N. Y.
Yula Water Heaters Inc., New York, N. Y.

VALVES, FORGED STEEL

Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Cochrane Corp., Philadelphia, Pa.

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- ● Crane Co., Chicago, Ill.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- Edward Valves, Inc., East Chicago, Ind.
- Grove Regulator Co., Oakland, Calif.
- ● Henry Valve Co., Chicago, Ill.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- ● Ohio Injector Co., Wadsworth, O.
- Parker Appliance Co., The, Cleveland, O.
- R-S Products Corp., Philadelphia, Pa.
- Schutte & Koerting Co., Philadelphia, Pa.
- ● Strong, Carlisle & Hammond Co., Cleveland, O.
- Vogt Machine Co., Henry, Louisville, Ky.
- Watson-Stillman Co., Roselle, N. J.

VALVES, GATE, ALLOY

- Alloy Steel Products Co., Linden, N. J.
- Cooper Alloy Foundry Co., Hillside, N. J.
- ● Crane Co., Chicago, Ill.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- Edward Valves, Inc., East Chicago, Ind.
- Electric Steel Foundry Co., Portland, Ore.
- Hasco Valve & Machine Co., Milwaukee, Wis.
- Hydro-Aire, Inc., Burbank, Calif.
- ● Jenkins Bros., New York, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
- Lunkenheimer Co., Cincinnati, O.
- Milwaukee Valve Co., Milwaukee, Wis.
- ● Ohio Injector Co., Wadsworth, O.
- Powell Co., Wm., Cincinnati, O.
- ● Walworth Co., New York, N. Y.
- Watson-Stillman Co., Roselle, N. J.
- Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, BRASS AND BRONZE

- American Brass Co., Waterbury, Conn.
- Belknap Mfg. Co., Bridgeport, Conn.
- Bordo Co., Inc., L. J., Glenside, Pa.
- Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
- Chase Brass & Copper Co., Waterbury, Conn.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Darling Valve Mfg. Co., Williamsport, Pa.
- Detroit Brass & Malleable Wks., Detroit, Mich.
- Detroit Lubricator Co., Detroit, Mich.
- Eddy Valve Co., Waterford, N. Y.
- Everlasting Valve Co., Jersey City, N. J.
- Fairbanks Co., New York, N. Y.
- ● Hammond Brass Wks., Hammond, Ind.
- Jarecki Mfg. Co., Erie, Pa.
- ● Jenkins Bros., New York, N. Y.
- Kennedy Valve Mfg. Co., Elmire, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Lead Lined Iron Pipe Co., Wakefield, Mass. (Tin lined)
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
- Lunkenheimer Co., Cincinnati, O.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Milwaukee Valve Co., Milwaukee, Wis.
- Morrison Brothers Co., Dubuque, Ia.
- Northern Indiana Brass Co., Elkhart, Ind.
- OPW Corp., Cincinnati, O.
- Ohio Brass Co., Mansfield, O.
- ● Ohio Injector Co., Wadsworth, O.
- Ostlind Valve, Inc., Portland, Ore.
- Pittsburgh Valve & Fittings Corp., Barberton, O.
- Powell Co., Wm., Cincinnati, O.
- Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- Rensselaer Valve Co., Cohoes, N. Y.
- Schaible Co., The, Cincinnati, O.
- Scott Valve Mfg. Co., Detroit, Mich.
- Stockham Valves & Fittings, Birmingham, Ala.
- ● Walworth Co., New York, N. Y.
- Williams Valve Co., D. T., Cincinnati, O.

VALVES, GATE, IRON BODY

- Bordo Co., Inc., L. J., Glenside, Pa.
- Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
- ● Crane Co., Chicago, Ill.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Eddy Valve Co., Waterford, N. Y.
- Everlasting Valve Co., Jersey City, N. J.
- Fairbanks Co., New York, N. Y.
- Jarecki Mfg. Co., Erie, Pa.
- ● Jenkins Bros., New York, N. Y.
- Kennedy Valve Mfg. Co., Elmira, N. Y.
- Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
- Ludlow Valve Mfg. Co., Troy, N. Y.
- Lunkenheimer Co., Cincinnati, O.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Mueller Co., Decatur, Ill.
- ● Ohio Injector Co., Wadsworth, O.
- Pittsburgh Valve & Fittings Co., Barberton, O.
- Powell Co., Wm., Cincinnati, O.
- Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- Rensselaer Valve Co., Cohoes, N. Y.
- Scott Valve Mfg. Co., Detroit, Mich.
- Semet-Solvay Engineering Corp., New York, N. Y.
- Stockham Valves & Fittings, Birmingham, Ala.
- ● Walworth Co., New York, N. Y.
- Whittaker Co., Wm. R., Los Angeles, Calif.
- Williams Valve Co., D. T., Cincinnati, O.

VALVES, GATE, MALLEABLE IRON

- Bordo Co., Inc., L. J., Glenside, Pa.
- ● Crane Co., Chicago, Ill.
- Powell Co., Wm., Cincinnati, O.

VALVES, GATE, STEEL

- Bordo Co., Inc., L. J., Glenside, Pa.
- Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
- ● Crane Co., Chicago, Ill.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- Edward Valves, East Chicago, Ind.
- Everlasting Valve Co., Jersey City, N. J.
- Hamer Oil Tool Co., Long Beach, Calif.
- ● Jenkins Bros., New York, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
- Lunkenheimer Co., Cincinnati, O.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- ● Ohio Injector Co., Wadsworth, O.
- Powell Co., Wm., Cincinnati, O.
- Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- Vogt Machine Co., Henry, Louisville, Ky.
- ● Walworth Co., New York, N. Y.
- Watson-Stillman Co., Roselle, N. J.
- Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GLOBE, ALLOY

- Alloy Steel Products Co., Linden, N. J.
- Cooper Alloy Foundry Co., Hillside, N. J.
- ● Crane Co., Chicago, Ill.
- Edward Valves, Inc., East Chicago, Ind.
- Electric Steel Foundry Co., Portland, Ore.
- Grove Regulator Co., Oakland, Calif.
- Hasco Valve & Machine Co., Milwaukee, Wis.
- ● Henry Valve Co., Chicago, Ill.
- ● Jenkins Bros., New York, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Klingerit, Inc., New York, N. Y.
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
- Milwaukee Valve Co., Milwaukee, Wis.
- ● Ohio Injector Co., Wadsworth, O.
- Powell Co., Wm., Cincinnati, O.
- ● Walworth Co., New York, N. Y.

VALVES, GLOBE, BRASS AND BRONZE

- American Brass Co., Waterbury, Conn.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Belknap Mfg. Co., Bridgeport, Conn.
- Bowser, Inc., Fort Wayne, Ind.
- California Brass Mfg. Co., Los Angeles, Calif.
- Central Valve Mfg. Co., Chicago, Ill.
- Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
- Chase Brass & Copper Co., Waterbury, Conn.
- Cleveland Brass Mfg. Co., The, Cleveland, O.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Detroit Brass & Malleable Wks., Detroit, Mich.
- Detroit Lubricator Co., Detroit, Mich.
- Fairbanks Co., New York, N. Y.
- ● Grinnell Co., Inc., Providence, R. I.
- Grove Regulator Co., Oakland, Calif.
- ● Hammond Brass Wks., Hammond, Ind.
- ● Henry Valve Co., Chicago, Ill.
- Jarecki Mfg. Co., Erie, Pa.
- ● Jenkins Bros., New York, N. Y.
- Kennedy Valve Mfg. Co., Elmira, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Klingerit, Inc., New York, N. Y.
- Kunkle Valve Co., Ft. Wayne, Ind.
- Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
- Lunkenheimer Co., Cincinnati, O.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Marsh Valve Co., Dunkirk, N. Y.
- Milwaukee Valve Co., Milwaukee, Wis.
- Morse-Smith-Morse, Inc., Watertown, Mass.
- Mueller Brass Co., Port Huron, Mich.
- Northern Indiana Brass Co., Elkhart, Ind.
- OPW Corp., Cincinnati, O.
- Ohio Brass Co., Mansfield, O.
- ● Ohio Injector Co., Wadsworth, O.
- Ostlind Valve, Inc., Portland, Ore.
- Parker Appliance Co., The, Cleveland, O.

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Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Weatherhead Co., Cleveland, O.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GLOBE, IRON BODY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Fairbanks Co., New York, N. Y.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Kunkle Valve Co., Ft. Wayne, Ind.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GLOBE, MALLEABLE IRON

● Crane Co., Chicago, Ill.
● Henry Valve Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GLOBE, STEEL

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
● Henry Valve Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Kunkle Valve Co., Ft. Wayne, Ind.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shank Co., Cyrus, Chicago, Ill.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J.

VALVES, LINED

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Darling Valve & Mfg. Co., Williamsport, Pa.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
National Lead Co., New York, N. Y. (Lead)
Paul Valve Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Schutte & Koerting Co., Philadelphia, Pa. (Lead)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

Bailey Co., Chas. M., San Francisco, Calif.
● Dole Valve Co., The, Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Fittings Co., Providence, R. I.
Holby Valve Co., New York, N. Y.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leonard Valve Co., Providence, R. I.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Thermo-Mix, Inc., Long Island City, N. Y.
Watts Regulator Co., Lawrenceville, Mass.
Yula Water Heaters Inc., New York, N. Y.

VALVES, MIXING, STEAM AND WATER

Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Fittings Co., Providence, R. I.
Hammel-Dahl Co., Providence, R. I.
● Johnson Service Co., Milwaukee, Wis.
Leonard Valve Co., Providence, R. I.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Vapor Heating Corp., Chicago, Ill.

VALVES, MOTOR OPERATED

● Alco Valve Co., St. Louis, Mo.
Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Foxboro Co., Foxboro, Mass.
● General Controls Co., Glendale, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
● Illinois Engineering Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
North American Mfg. Co., Cleveland, O.
Paul Valve Corp., New York, N. Y.
● Penn Electric Switch Co., Goshen, Ind.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarcotherm Controls, Inc., New York, N. Y.
Saval, Inc., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
Tallmadge & Co., Webster, East Orange, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, NEEDLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel).
● Automatic Products Co., Milwaukee, Wis. (Oil).
Beckett & Co., Inc., Thomas, Dallas, Tex.
Carpenter Mfg. Corp., The, Cleveland, O. (Stainless steel stem, brass bar stock body)
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.

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Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Lubricator Co., Detroit, Mich.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Lunkenheimer Co., Cincinnati, O.
● Maid-O'-Mist, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Norgren Co., C. A., Denver, Colo.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Patrol Valve Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
● Walworth Co., New York, N. Y.
Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
Webster Electric Co., Racine, Wis. (Pressure regulating valve for oil burners).
Williams Valve Co., D. T., Cincinnati, O.

VALVES, PLASTIC

Haveg Corp., Newark, Del.

VALVES, PLUG

Altens Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., Pittsburgh, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting).
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., New York, N. Y.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hydro-Aire, Inc., Burbank, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Knight, Maurice A., Akron, O. (Stoneware).
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber).
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa. (Lubricated).
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Porter Co., Inc., H. K., Pittsburgh, Pa.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Taylor Instrument Companies, Rochester, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.
● Walworth Co., New York, N. Y.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Williams Valve Co., D. T., Cincinnati, O.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton-Cadwell Mfg. Co., New Britain, Conn.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Regulator and Instrument Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Gold Top Heating, Inc., Butte, Mont.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Harris Calorific Co., The, Cleveland, O.
● Henry Valve Co., Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
Northern Equipment Co., Erie, Pa.
● Penn Electric Switch Co., Goshen, Ind.
● Powers Regulator Co., Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Yula Water Heaters, Inc., New York, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Hoffman Specialty Co., Indianapolis, Ind.

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- ● Illinois Engineering Co., Chicago, Ill.
- Kainer & Co., Chicago, Ill.
- Keckley Co., O. C., Chicago, Ill.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Hamilton, O.
- Leslie Co., Lyndhurst, N. J.
- Locke Regulator Co., Salem, Mass.
- Mason-Neilan Regulator Co., Boston, Mass.
- McAlear Mfg. Co., Chicago, Ill.
- Mueller Co., Decatur, Ill.
- Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
- ● Powers Regulator Co., Chicago, Ill.
- Republic Flow Meters Co., Chicago, Ill.
- Sall Bros. Co., Rockford, Ill.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Schaible Co., The, Cincinnati, O.
- Spence Engineering Co., Inc., Walden, N. Y.
- Stickle Steam Specialties Co., Indianapolis, Ind.
- ● Strong, Carlisle & Hammond Co., Cleveland, O.
- Taco Heaters, Inc., Providence, R. I.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- ● Thrush & Co., H. A., Peru, Ind.
- ● Trane Co., The, LaCrosse, Wis.
- Trerice Co., H. O., Detroit, Mich.
- Triplex Heating Specialty Co., Inc., Peru, Ind.
- Watson & McDaniel Co., Philadelphia, Pa.
- Watts Regulator Co., Lawrence, Mass.
- White Flomatic Corp., Hoosick Falls, N. Y.
- Yula Water Heaters Inc., New York, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, STEAM

- American District Steam Co., North Tonawanda, N. Y.
- Atlas Valve Co., Inc., Newark, N. J.
- Bailey Co., Chas. M., San Francisco, Calif.
- Bailey Meter Co., Cleveland, O.
- Belfield Co., H., Philadelphia, Pa.
- Boylston Steam Specialty Co., Chicago, Ill.
- Brooke Engineering Co., Inc., Philadelphia, Pa.
- ● Cash Co., A. W., Decatur, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- Central Brass Mfg. Co., Cleveland, O.
- Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
- Clark Mfg. Co., Cleveland, O.
- Conoflow Corp., Philadelphia, Pa.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Davis Regulator Co., Chicago, Ill.
- Defender Instrument and Regulator Co., St. Louis, Mo.
- d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
- ● Dunham Co., C. A., Chicago, Ill.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Fisher Governor Co., Marshalltown, Ia.
- Foster Engineering Co., Newark, N. J.
- ● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn
- ● General Controls Co., Glendale, Calif.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Grove Regulator Co., Oakland, Calif.
- Hagan Corp., Pittsburgh, Pa.
- Hammel-Dahl Co., Providence, R. I.
- ● Hoffman Specialty Co., Indianapolis., Ind.
- Hubbell Corp., Chicago, Ill.
- ● Illinois Engineering Co., Chicago, Ill.
- Kaye & MacDonald, Inc., West Orange, N. J.
- Keckley Co., O. C., Chicago, Ill.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Hamilton, O.
- Leslie Co., Lyndhurst, N. J.
- Locke Regulator Co., Salem, Mass.
- Mason-Neilan Regulator Co., Boston, Mass.
- McAlear Mfg. Co., Chicago, Ill.
- Mueller Co., Decatur, Ill.
- Mueller Steam Specialty Co., Inc., Long Island City, N. Y
- Northern Equipment Co., Erie, Pa
- ● Powers Regulator Co., Chicago, Ill.
- Republic Flow Meters Co., Chicago, Ill.
- Ross Valve Mfg. Co., Inc., Troy, N. Y.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Schutte & Koerting Co., Philadelphia, Pa.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Spence Engineering Co., Inc., Walden, N. Y.
- Squires Co., C. E., Cleveland, O.
- Staples & Pfeiffer, San Francisco, Calif.
- Stickle Steam Specialties Co., Indianapolis, Ind.
- ● Strong, Carlisle & Hammond Co., Cleveland, O.
- ● Swartwout Co., Cleveland, O.
- Tagliabue Corp., C. J., Newark, N. J.
- Taylor Instrument Companies, Rochester, N. Y.
- Trerice Co., H. O., Detroit, Mich.
- Vapor Heating Corp., Chicago, Ill.
- Watson & McDaniel Co., Philadelphia, Pa.
- Watts Regulator Co., Lawrence, Mass.

VALVES, PUMP

- Anchor Packing Co., Philadelphia, Pa.
- Burrows Mfg. Co., F. A., York, Pa.
- Dick Co., Inc., R. & J., Passaic, N. J.
- Durabla Mfg. Co., New York, N. Y.
- Garlock Packing Co., Palmyra, N. Y.
- Goodrich Co., B. F., Akron, O.
- Jacuzzi Bros., Inc., Richmond, Calif.
- Quaker Rubber Corp., Philadelphia, Pa.
- Raybestos-Manhattan, Inc., Passaic, N. J.
- Red Jacket Mfg. Co., Davenport, Ia.
- United States Rubber Company, New York, N. Y.
- Williams Gauge Co., The, Pittsburgh, Pa.

VALVES, RADIATOR, AIR

- ● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
- Anderson Products, Inc., Cambridge, Mass.
- Beaton & Cadwell Mfg. Co., New Britain, Conn.
- Beaton & Corbin Mfg. Co., Southington, Conn.
- Bridgeport Brass Co., Bridgeport, Conn.
- Chicago Specialty Mfg. Co., Chicago, Ill.
- Curtis Automotive Devices, Inc., Dayton, O.
- Detroit Brass & Malleable Works, Detroit, Mich.
- Detroit Lubricator Co., Detroit, Mich.
- ● Dole Valve Co., The, Chicago, Ill.
- Gold Top Heating Inc., Butte, Mont.
- Gorton Heating Co., Cranford, N. J.
- Heat Timer Corp., New York, N. Y.
- ● Hoffman Specialty Corp., Indianapolis, Ind.
- Keeney Mfg. Co., Newington, Conn.
- Little Mfg. Co., M. S., Hartford, Conn.
- ● Maid-O'-Mist, Inc., Chicago, Ill. (Humidifying)
- Majot Automatic Machine Co., Inc., East Orange, N. J.
- McAlear Mfg. Co., Chicago, Ill.
- New York Air Valve Corp., New York, N. Y.
- Positive Control Co., The, Cincinnati, O.
- ● Powers Regulator Co., Chicago, Ill.
- Riggio Co., Frank D., Rutherford, N. J.
- Schaible Co., The, Cincinnati, O.
- Taco Heaters, Inc., Providence, R. I.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

- ● Barber-Colman Co., Rockford, Ill.
- ● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Vapor Heating Corp., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

- ● Johnson Service Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- ● Powers Regulator Co., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

- Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
- ● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
- Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
- Majot Automatic Machine Co., Inc., East Orange, N. J.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- ● Powers Regulator Co., Chicago, Ill.
- ● Sterling, Inc., Milwaukee, Wis.
- ● Trane Co., The, LaCrosse, Wis.

VALVES, RADIATOR, ORIFICE

- American District Steam Co., North Tonawanda, N. Y.
- ● Autempco Corp., New York, N. Y.
- ● Barnes & Jones, Inc., Boston, Mass.
- ● Dunham Co., C. A., Chicago, Ill.
- ● Grinnell Co., Inc., Providence, R. I.
- ● Illinois Engineering Co., Chicago, Ill.
- Marsh Valve Co., Dunkirk, N. Y.
- New York Air Valve Corp., New York, N. Y.
- ● Sarco Co., Inc., New York, N. Y.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Simplex Heating Specialty Co., Inc., Lynchburg, Va.
- ● Trane Co., The, LaCrosse, Wis.
- ● Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

- ● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
- ● Barnes & Jones, Inc., Boston, Mass.
- Belknap Mfg. Co., Bridgeport, Conn.

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- ● **Bishop & Babcock Mfg. Co., Cleveland, O.**
- Chase Brass & Copper Co., Waterbury, Conn.
- ● Crane Co., Chicago, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- ● Dunham Co., C. A., Chicago, Ill.
- Fairbanks Co., New York, N. Y.
- ● Grinnell Co., Inc., Providence, R. I.
- ● Haines & Co., William S., Philadelphia, Pa.
- ● Hammond Brass Wks., Hammond, Ind.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- ● Illinois Engineering Co., Chicago, Ill.
- ● Jenkins Bros., New York, N. Y.
- Kennedy Valve Mfg. Co., Elmira, N. Y.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- Marsh Valve Co., Dunkirk, N. Y.
- Milwaukee Valve Co., Milwaukee, Wis.
- Ohio Brass Co., Mansfield, O.
- ● **Ohio Injector Co., Wadsworth, O.**
- Powell Co., Wm., Cincinnati, O.
- Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- ● Sarco Co., Inc., New York, N. Y.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Schaible Co., The, Cincinnati, O.
- Scott Valve Mfg. Co., Detroit, Mich.
- ● **Sterling, Inc., Milwaukee, Wis.**
- ● Trane Co., The, La Crosse, Wis.
- United States Radiator Corp., Detroit, Mich.
- ● Webster & Co., Warren, Camden, N. J.
- Williams Valve Co., D. T., Cincinnati, O.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

- American District Steam Co., North Tonawanda, N. Y.
- ● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
- ● Barnes & Jones, Inc., Boston, Mass.
- ● Bishop & Babcock Mfg. Co., Cleveland, O.
- Cashin Co., W. D., Boston, Mass.
- Cryer Trap & Valve Co., Inc., New York, N. Y.
- ● Dunham Co., C. A., Chicago, Ill.
- ● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
- ● Haines & Co., William S., Philadelphia, Pa.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- ● Illinois Engineering Co., Chicago, Ill.
- ● Jenkins Bros., New York, N. Y.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- Marsh Valve Co., Dunkirk, N. Y.
- ● **Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.**
- Mouat Vapor Heating Co., The, Cleveland, O.
- Ohio Brass Co., Mansfield, O.
- ● Sarco Co., Inc., New York, N. Y.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Simplex Heating Specialty Co., Inc., Lynchburg, Va.
- ● **Sterling, Inc., Milwaukee, Wis.**
- Tallmadge & Co., Webster, East Orange, N. J.
- Vapor Specialty Co., New York, N. Y.
- ● Webster & Co., Warren, Camden, N. J.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

- ● **Baker Ice Machine Co., Inc., Omaha, Neb.**
- **Black-Sivalls & Bryson, Inc., Kansas City, Mo.**
- **Central Brass Mfg. Co., Cleveland, O.**
- ● **Crane Co., Chicago, Ill.**
- Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
- Detroit Stamping Co., Detroit, Mich.
- ● **Frick Co., Waynesboro, Pa.**
- Hammel-Dahl Co., Providence, R. I.
- ● Henry Valve Co., Chicago, Ill.
- Hubbell Corp., Chicago, Ill.
- Imperial Brass Mfg. Co., Chicago, Ill.
- ● Jenkins Bros., New York, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Klingerit, Inc., New York, N. Y.
- Lonergan Co., J. E., Philadelphia, Pa.
- Lunkenheimer Co., Cinncinati, O.
- Mueller Brass Co., Port Huron, Mich.
- Parker Appliance Co., The, Cleveland, O.
- **Reynolds Mfg. Co., Inc., Springfield, Mo.**
- Shank Co., Cyrus, Chicago, Ill.
- Superior Valve and Fittings Co., Pittsburgh, Pa.
- Triumph Ice Machine Co., Cincinnati, O.
- Vilter Mfg. Co., Milwaukee, Wis.
- Vogt Machine Co., Henry, Louisville, Ky.
- Watson-Stillman Co., Roselle, N. J.
- Weatherhead Co., Cleveland, O.
- ● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- York Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

- ● Alco Valve Co., St. Louis, Mo.
- Aminco Refrigeration Products Co., Detroit, Mich.
- **Bailey Co., Chas. M., San Francisco, Calif.**
- ● Cash Co., A. W., Decatur, Ill.
- Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
- Electrimatic, Chicago, Ill.
- Fisher Governor Co., Marshalltown, Ia.
- Foster Engineering Co., Newark, N. J.
- Frigidaire Div., General Motors Corp., Dayton, O.
- ● General Controls Co., Glendale, Calif.
- Hammel-Dahl Co., Providence, R. I.
- ● Henry Valve Co., Chicago, Ill.
- Hubbell Corp., Chicago, Ill.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Lonergan Co., J. E., Philadelphia, Pa.
- Mueller Brass Co., Port Huron, Mich.
- Schnacke, Inc., Evansville, Ind.
- Temprite Products Corp., Detroit, Mich.
- Watson-Stillman Co., Roselle, N. J.
- X L Refrigerating Co., Chicago, Ill.
- York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

- ● Alco Valve Co., St. Louis, Mo.
- Aminco Refrigeration Products Co., Detroit, Mich.
- ● Automatic Products Co., Milwaukee, Wis.
- ● Baker Ice Machine Co., Inc., South Windham, Me.
- ● Cash Co., A. W., Decatur, Ill.
- ● Crane Co., Chicago, Ill.
- Detroit Lubricator Co., Detroit, Mich.
- Foster Engineering Co., Newark, N. J.
- Frigidaire Div., General Motors Corp., Dayton, O.
- Hammel-Dahl Co., Providence, R. I.
- Hubbell Corp., Chicago, Ill.
- **Lonergan Co., J. E., Philadelphia, Pa.**
- Mayson Mfg. Co., Inc., Detroit, Mich.
- Peerless of America, Inc., Chicago, Ill.
- Tenney Engineering, Inc., Newark, N. J.
- X L Refrigerating Co., Chicago, Ill.
- York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

- ● Alco Valve Co., St. Louis, Mo.
- ● Automatic Products Co., Milwaukee, Wis.
- Detroit Lubricator Co., Detroit, Mich.
- Frigidaire Div., General Motors Corp., Dayton, O.
- ● General Controls Co., Glendale, Calif.
- Mayson Mfg. Co., Inc., Detroit, Mich.
- Peerless of America, Inc., Chicago, Ill.
- ● Sporlan Valve Co., St. Louis, Mo.
- Tenney Engineering, Inc., Newark, N. J.
- X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

- ● Alco Valve Co., St. Louis, Mo.
- Aminco Refrigeration Products Co., Detroit, Mich.
- Foster Engineering Co., Newark, N. J.
- ● Frick Co., Waynesboro, Pa.
- Hubbell Corp., Chicago, Ill.
- Imperial Brass Mfg. Co., Chicago, Ill.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Hamilton, O.
- Magnetrol, Inc., Chicago, Ill.
- ● Mercoid Corp., Chicago, Ill.
- Phillips & Co., H. A., Chicago, Ill.
- **Temprite Products Corp., Detroit, Mich.**
- Vilter Mfg. Co., Milwaukee, Wis.
- Voss Co., J. H. H., Inc., New York, N. Y.
- **Wabash Mfg. Co., Chicago, Ill.**
- Weatherhead Co., Cleveland, O.
- ● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- York Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

- American Injector Co., Detroit, Mich.
- Aminco Refrigeration Products Co., Detroit, Mich.
- Klipfel Mfg. Co., Hamilton, O.
- **Mayson Mfg. Co., Inc., Detroit, Mich.**
- **Temprite Products Corp., Detroit, Mich.**
- **Vilter Mfg. Co., Milwaukee, Wis.**
- Voss Co., J. H. H., Inc., New York, N. Y.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

- ● Alco Valve Co., St. Louis, Mo.
- Klipfel Mfg. Co., Hamilton, O.
- Phillips & Co., H. A., Chicago, Ill.

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VALVES, REFRIGERATION, MAGNETIC STOP

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
Cooper Co., Clark, Palmyra, N. Y.
Detroit Lubricator Co., Detroit, Mich.
Electrimatic, Chicago, Ill.
● Frick Co., Waynesboro, Pa.
● General Controls Co., Glendale, Calif.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
● Penn Electric Switch Co., Goshen, Ind.
● Sporlan Valve Co., St. Louis, Mo.

VALVES, REFRIGERATION, TEMPERATURE REGULATING OR SNAP ACTION SUCTION

● Alco Valve Co., St. Louis, Mo.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

Aminco Refrigeration Products Co., Detroit, Mich.
Art Valve Co., Chicago, Ill.
● Automatic Products Co., Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
● Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Electrimatic, Chicago, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Mayson Mfg. Co., Detroit, Mich.
● Mercoid Corp., Chicago, Ill.
Mueller Co., Decatur, Ill.
● Penn Electric Switch Co., Goshen, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill.
● Sarco Co., Inc., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Corp., C. J., Newark, N. J.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Patrol Valve Co., The, Cleveland, O.
Sall Bros. Co., Rockford, Ill.
Schaible Co., The, Cincinnati, O.
Spencer Thermostat Co., Attleboro, Mass.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Ashton Valve Co., Cambridge, Mass.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Durabla Mfg. Co., New York, N. Y.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Neptune Meter Co., New York, N. Y.
OPW Corp., Cincinnati, O.
Parker Appliance Co., The, Cleveland, O.
Patrol Valve Co., The, Cleveland, O.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Spencer Thermostat Co., Attleboro, Mass.
Staples & Pfeiffer, San Francisco, Calif.
Sullivan Valve & Engineering Co., Butte, Mont.
● Swartwout Co., Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Tagliabue Corp., C. J., Newark, N. J.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
● Crane Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Mueller Co., Decatur, Ill.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, OIL

Andale Co., Philadelphia, Pa.
Ashton Valve Co., Cambridge, Mass.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Durabla Mfg. Co., New York, N. Y.
Electrol, Inc., Kingston, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Klipfel Mfg. Co., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Locke Regulator Co., Salem, Mass.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Morrison Brothers Co., Dubuque, Ia.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Parker Appliance Co., The, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Staples & Pfeiffer, San Francisco, Calif.
Thermix Corp., The, Greenwich, Conn.
Watson & McDaniel Co., Philadelphia, Pa.

VALVES, SADDLE

Beckett & Co., Inc., Thomas, Dallas, Tex.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Maid-O'-Mist, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Ohio Injector Co., Wadsworth, O.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

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VALVES, SAFETY, STEAM

Ashton Valve Co., Cambridge, Mass.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Newark, N. J.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
North American Mfg. Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.

VALVES, SLIDE

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Saval Inc., Los Angeles, Calif.

VALVES, SOLDER JOINT

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
• Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., New York, N. Y. (Silver braze joints)
• Hammond Brass Works, Hammond, Ind.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
• Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
• Walworth Co., New York, N. Y. (Brazed)
Weatherhead Co., Cleveland, O.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, SOLENOID

• Alco Valve Co., St. Louis, Mo.
Allied Control Co., Inc., New York, N. Y.
Allied Control Valve Div., Skinner Chuck Co., Norwalk, Conn.
• Autempco Corp., New York, N. Y.
• Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
• Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Caton Co., Newark, N. J.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Detroit Lubricator Co., Detroit, Mich.
Electric Valve Mfg. Co., Inc., New York, N. Y.
Electrimatic, Chicago, Ill.
Electrol, Inc., Kingston, N. Y.
Erickson Specialty Co., Cohoes, N. Y.
• Frick Co., Waynesboro, Pa.
• General Controls Co., Glendale, Calif.
• General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hays Mfg. Co., Erie, Pa.
• Henry Valve Co., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hubbell Corp., Chicago, Ill.
Hunt & Son, C. B., Salem, O.
Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Lammert & Mann Co., Chicago, Ill. (Gas safety shut-off)
Lonergan Co., J. E., Philadelphia, Pa.
• McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
• Nicholson & Co., W. H., Wilkes-Barre, Pa.
Paul Valve Corp., New York, N. Y.
• Penn Electric Switch Co., Goshen, Ind.
Pfening Co., Fred D., Columbus, O. (1" water and steam)
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
• Sarco Co., Inc., New York, N. Y.
• Sarcotherm Controls, Inc., New York, N. Y.
Saval, Inc., Los Angeles, Calif.
Skinner Electric Valve Div., Norwalk, Conn.
• Sporlan Valve Co., St. Louis, Mo.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Supreme Electric Products Corp., Rochester, N. Y.
Locke Regulator Co., Salem, Mass.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

VALVES, 2, 3 AND 4 WAY

• Aloo Valve Co., St. Louis, Mo.
Allied Control Co., Inc., New York, N. Y.
Allied Control Valve Div., Skinner Chuck Co., Norwalk, Conn.
American Brass Co., Waterbury, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
• Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bordo Co., Inc., L. J., Glenside, Pa.
Bristol Co., The, Waterbury, Conn.
• Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Caton Co., Newark, N. J.
Clark Controller Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
• Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Detroit Lubricator Co., Detroit, Mich.
Fisher Governor Co., Marshalltown, Ia.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
• General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
• Henry Valve Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, C. B., Salem, O.
Hydro-Aire, Inc., Burbank, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
• Johnson Service Co., Milwaukee, Wis.
Keller Tool Co., Grand Haven, Mich.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
• Mercoid Corp., Chicago, Ill.
• Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
• Nicholson & Co., W. H., Wilkes-Barre, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
• Penn Electric Switch Co., Goshen, Ind.
Powell Co., Wm., Cincinnati, O.
• Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
• Sarcotherm Controls, Inc., New York, N. Y.
Saval, Inc., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
• Walworth Co., New York, N. Y. (Lubricated plug valves)
Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
Weatherhead Co., Cleveland, O.
Williams Valve Co., D. T., Cincinnati, O.

VANES, DUCT TURNING, PREFABRICATED

• Anemostat Corp. of America, New York, N. Y. (Equalizing deflectors)
• Barber-Colman Co., Rockford, Ill.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
• Titus Mfg. Corp., Waterloo, Ia.
• Tuttle & Bailey, Inc., New Britain, Conn.

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical, Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY REGULATORS

See Regulators, Air Velocity

VENT FLUE CAPS

See Caps, Vent Flue

VENTILATING HOSE

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

VENTILATION HEATERS

See Surface, Finned, Heating

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VENTILATORS, MUSHROOM

● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dickinson, Aeolus, Chicago, Ill.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Knight, Maurice A., Akron. O. (Stoneware)
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Lumm Co., A. H., Toledo, O.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Penn Ventilating Co., Philadelphia, Pa.
Van Noorden Co., E., Boston, Mass.
Ventilating Products Co., Chicago, Ill.

VENTILATORS, ROOF, FAN

Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airecon Industries, Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Minn.
American Coolair Corp., Jacksonville, Fla.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Steel Band Co., Pittsburgh, Pa.
Arex Co., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
● Bishop & Babcock Co., Cleveland, O.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Clay Equipment Corp., Cedar Falls, Ia.
Dana Fan & Blower Corp., Cincinnati, O.
Davidson Hy Duty Roof Fan Co., Newton, Mass.
● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Co., Somerville, N. J.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Fingles Co., The, Baltimore, Md.
Gallaher Co., The, Owatonna, Minn.
Gehri Co., Tacoma, Wash.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Howes-Woods Co., Cambridge, Mass.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Jenn Air Products Co., Indianapolis, Ind.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
● King Co., The, Owatonna, Minn.
Lee & Son Co., Thomas, Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Martin Fan & Blower Co., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Inc., Pittsburgh, Pa.
● New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Peerless Electric Co., Warren, O.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Powermatic Ventilator Co., Cleveland, O.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers, Inc., H. J., Detroit, Mich.
● South Bend Air Products, Inc., South Bend, Ind.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
● Swartwout Co., Cleveland, O.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
Uno Ventilator Co., Cliftondale, Mass.
● Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Washburn & Co., E. G., New York, N. Y.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.
● Wing Mfg. Co., L. J., New York, N. Y.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

VENTILATORS, ROOF, GRAVITY

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Air Control Products, Inc., Coopersville, Mich.
● Air Devices, Inc., New York, N. Y.
Airecon Industries, Detroit, Mich.
Airjet Ventilator Co., Pasadena, Calif.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Metal Products Co., Fort Worth, Tex.
American Sheet Metal Works, New Orleans, La.
American Steel Band Co., Pittsburgh, Pa.
Arex Co., Chicago, Ill.
Autoforce Ventilating System, Boston, Mass.
Berger Bros. Co., Philadelphia, Pa.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works Co., Hagerstown, Md.
Day Co., The, Minneapolis, Minn.
Dickinson, Aeolus, Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Fingles Co., The, Baltimore, Md.
Gehri Co., Tacoma, Wash.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Howes-Woods Co., Cambridge, Mass.
Inland Steel Products Co., Milwaukee, Wis.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jamar Co., Walker, Duluth, Minn.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
● King Co., The, Owatonna, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lee & Son Co., Thomas, Cincinnati, O.
Leslie Welding Co., Chicago, Ill.
Levow, David, New York, N. Y.
Lumm Co., A. H., Toledo, O.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Mellish & Murray Co., Chicago, Ill.
Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
● National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Patten Co., J. V., Sycamore, Ill.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
Plasteel Products Co., Washington, Pa.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Souther Iron Co., E. E., St. Louis, Mo.
Southern States Iron Roofing Co., Savannah, Ga.
Standard Furnace & Supply Co., Omaha, Neb.
Standard Ventilator Co., Lewisburg, Pa.
● Swartwout Co., Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Eaves Trough Co., Tiffin, O.
Uno Ventilator Co., Cliftondale, Mass.
Van Noorden Co., E., Boston, Mass.
● Warner Ventilator Co., La Grange, Ind.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Willis Steel Corp., Galesburg, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
York Corrugating Co., York, Pa.

VENTILATORS, UNIT

● American Blower Corp., Detroit, Mich.
Circulators & Devices Mfg. Corp., New York, N. Y.
Johnson Fan & Blower Corp., Chicago, Ill.
Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless Unit Ventilation Co., Inc., Bridgeport, Conn.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
● Trane Co., The, LaCrosse, Wis.

VIBRATION ABSORBERS

See Absorbers, Vibration

VIBRATION ELIMINATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VISCOSIMETERS

American Instrument Co., Silver Spring, Md.
Brabender Corp., Rochelle Park, N. J.
Brookfield Engineering Laboratories, Stoughton, Mass.
Daigger & Co., A., Chicago, Ill.
Fish-Schurman Corp., New York, N. Y.

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● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Giannini Co. Inc., G. M., Pasadena, Calif.
Greiner Co., Emil, New York, N. Y.
Humboldt Mfg. Co., Chicago, Ill.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Precision Scientific Co., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Thomas Co., Arthur H., Philadelphia, Pa.
Will Corp., Rochester, N. Y.

VISCOUS LIQUID PUMPS

See Pumps, Viscous Liquids

VISES, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O. (Sawing—for tubing)
Billings & Spencer Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Desmond-Stephens Mfg. Co., Urbana, O.
Erie Tool Wks., Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Munton Mfg. Co., Franklin Park, Ill.
Nye Tool Co., Chicago, Ill.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Roxbury, Mass.
Vanderman Mfg. Co., Willimantic, Conn.
V-Mac Industries, Guilford, Conn.
Williams & Co., J. H., Buffalo, N. Y.
Yost Mfg. Co., Meadville, Pa.

VISE STANDS

See Stands, Pipe Vise

WALL THERMOSTATS

See Thermostats, Room or Wall

WARM AIR FURNACES

See Furnaces, Warm Air

WASHERS, AIR

● Air & Refrigeration Corp., New York, N. Y.
Airwasher Corp., Lansing, Mich.
Alton Mfg. Co., Dallas, Tex.
● American Blower Corp., Detroit, Mich.
Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
Centri-Spray Corp., Detroit, Mich. (Wet type)
● Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
● Comfort Products Corp., Dallas, Tex.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lehigh Fan & Blower Co., Allentown, Pa.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
● Murray Mfg. Co., D. J., Wausau, Wis.
Parks-Cramer Co., Fitchburg, Mass.
Peters-Dalton, Inc., Detroit, Mich.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Strandwitz & Co., Inc., W. J., Camden, N. J.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
York Corp., York, Pa.

WATER CHILLERS

See Chillers, Water, for Air Conditioning and Refrigeration

WATER DISTRIBUTORS FOR CONDENSERS

See Distributors, Water, for Condensers

WATER FILTERS

See Filters, Water

WATER HEATERS

See Heaters, Indirect, Submerged; Heaters, Water

WATER METERS

See Meters, Water

WATER SOFTENERS

See Softeners, Water

WATER TREATMENT

See Treatment, Water, to Inhibit Corrosion

WATER VAPOR REFRIGERATION

See Compressors, Refrigerating, Centrifugal; and Compressors, Refrigerating, Steam Jet

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Borm Mfg. Co., Elgin, Ill.
Eisler Engineering Corp., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Fern, Ralph, Scranton, Pa.
● General Electric Co., Apparatus Dept., Schenectady, N. Y.
Glenn-Roberts Co., Inc., Indianapolis, Ind.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hobart Bros. Co., Troy, O.
Ideal Electric & Mfg. Co., Mansfield, O.
Kern Co., John A., Chicago, Ill.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Metal & Thermit Corp., New York, N. Y.
Mid-States Equipment Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Sight Feed Generator Co., Richmond, Ind.
Smith Corp., A. O., Milwaukee, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Trindl Products, Ltd., Chicago, Ill.
Tweco Products Co., Wichita, Kan. (Cable connectors, electrode holders and accessories)
Una Welding, Inc., Cleveland, O. (Automatic shielded arc welding)
Universal Power Corp., Cleveland, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Neb.
Wilson Welder & Metals Co., Inc., New York, N. Y.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif.
Acro Welder Mfg. Co., Milwaukee, Wis.
Agnew Electric Co., Milford, Mich.
Alphil Spot Welding Co., Brooklyn, N. Y.
Doall Co., The, Des Plaines, Ill.
Eisler Engineering Corp., Newark, N. J.
Electric Arc, Inc., Newark, N. J.

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Federal Machine & Welder Co., The, Warren, O.
Fern, Ralph, Scranton, Pa.
Micro Products Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Precision Welder & Machine Co., Cincinnati, O.
Rex Welder & Engineering Co., Kansas City, Mo.
Sciaky Bros., Inc., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Thomson Electric Welder Co., Lynn, Mass.
Universal Power Corp., Cleveland, O.
Universal Welder Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.

WELDERS, STUD

Federal Machine & Welder Co., The, Warren, O.
Nelson Specialty Welding Equipment Corp., San Leandro, Calif.
Powder Power Tool Corp., Portland, Ore.

WELDING COMPOUNDS

See Compounds, Welding

WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Arcos Corp., Philadelphia, Pa. (arc-oxygen)
Atlas Welding Accessories Co., Detroit, Mich. (Weld cleaning tools)
Black Mfg. Co., The, Baltimore, Md.
Dockson Corp., Detroit, Mich.
Ergolyte Mfg. Co., Philadelphia, Pa.
Galv-Weld Products, Dayton, O. (Regalvanizing process)
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas Products Co., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Smith Welding Equipment Corp., Minneapolis, Minn.
Tru-Line Corp., Santa Monica, Calif. (Protractor for marking pipe)
Universal Power Corp., Cleveland, O.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Dunellen, N. J. (Welding positioner)

WELDING FUME COLLECTORS

See Exhausters, Welding Fume

WELDING PIPE CLAMPS

See Clamps, Pipe, Welding

WELDING RINGS

See Rings, Welding

WELDING ROD

See Rod, Gas Welding

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airborne Industries Inc., Minneapolis, Minn.
Bayley Blower Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., The, Kalamazoo, Mich.
Burden Co., Los Angeles, Calif.
Champion Blower & Forge Co., Lancaster, Pa.
● Clarage Fan Co., Kalamazoo, Mich.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Janette Mfg. Co., Chicago, Ill.
Johnson Fan & Blower Corp., Chicago, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Mayne Products Co., Dayton, O.
Morrison Products, Inc., Cleveland, O.
● New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Revcor, not Inc., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Torrington Mfg. Co., Torrington, Conn.
Triangle Mfg. Co., Oshkosh, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.

WHITE PRINT MACHINES

See Machines, Blue Print and White Print

WINDOW VENTILATOR AND FILTER UNITS

See Units, Window Ventilator and Filter

WINDOWS, HEAT INSULATING

Andersen Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Co., New York, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.
Truscon Steel Co., Youngstown, O.

WOOD PIPE

See Pipe, Wood

WRENCHES, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Bernz Co., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Erie Tool Works, Erie, Pa.
E-Zee Tool Mfg. Corp., New York, N. Y.
International Nutyp Tool Co., Oswego, N. Y.
Lowell Wrench Co., Worcester, Mass.
Nye Tool Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
USHCO Mfg. Co., Inc., Buffalo, N. Y.
● Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, TORQUE INDICATING

Ammco Tools, Inc., North Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
J. O. Mfg. Co., South Gate, Calif.
Richmont, Inc., Los Angeles, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
Williams & Co., J. H., Buffalo, N. Y.

WROUGHT IRON PIPE

See Pipe, Wrought Iron

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WROUGHT IRON SHEETS

See Sheets, Wrought Iron

X-RAY MACHINES AND FILM

See Machines and Film, X-Ray

ZINC SHEETS

See Sheets, Zinc

ZONE CONTROLS

See Systems, Heating, Zone Control

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DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 2—TRADE NAMES

A-B—Motor controllers. Allen-Bradley Co., Milwaukee, Wis.

ABC—Humidifiers, dust collectors, unit coolers. American Blower Corp., Detroit, Mich.

A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.

ACB—Coatings. Tropical Paint & Oil Co., Cleveland, O.

A/C Range—Filters, American Air Filter Co., Inc., Louisville, Ky.

AGP—Heaters. American Radiator & Standard Sanitary Corp. Pittsburgh, Pa.

A-P—Damper operators, regulators, thermostats, valves. Automatic Products Co., Milwaukee, Wis.

A.P.S. Plasteel—Metal sheets. Plasteel Products Co., Washington, Pa.

A.R.A.—Non-metallic sheets and board. Wilson, Inc., Grant, Chicago, Ill.

ARRC—Couplings, fittings, flanges, unions. Union Metal Wks., Chelsea, Mass.

ASBO—Ventilators. American Steel Band Co., Pittsburgh, Pa.

Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Abso-Lute—Cement and compounds. Key Co., East St. Louis, Ill.

Accordion—Insulation. Infra Insulation, Inc., New York, N. Y.

Ace—Dampers. Martens & Stormoen, Boston, Mass.

Ace—Fittings, pipe, pumps, tanks, valves. American Hard Rubber Co., New York, N. Y.

Ace—Welders. Peer, Inc., Benton Harbor, Mich.

Ace-Parian—Fittings. Pipe. American Hard Rubber Co., New York, N. Y.

Ace-Saran—Pipe, tubing. American Hard Rubber Co., New York, N. Y.

Aco-Fin—Radiation. Airecon Industries, Detroit, Mich.

Acotite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.

Acousteel—Insulation. Celotex Corp., The, Chicago, Ill.

Acousti-Celotex—Insulation. Celotex Corp., The, Chicago, Ill.

Acoustilite—Insulation. Insulite Co., Minneapolis, Minn.

Acoustone—Insulation. United States Gypsum Co., Chicago, Ill.

Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Actex—Heat exchangers. Wabash Mfg. Co., Chicago, Ill.

Adamant—Fire brick cement. Botfield Refractories Co., Philadelphia, Pa.

Adastic—Insulating cement. Botfield Refractories Co., Philadelphia, Pa.

Adjust-O-Feeder—Feeders, pumps, steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.

Adjustor—Heating systems. The Kehm Corp., Chicago, Ill.

Adsco—Coils, conduit, regulators, coolers, exchangers, heaters, joints, meters, pipe, pipe hangers and supports, pipe protectors, separators, sight glasses, strainers, regulators, valves. American District Steam Co., North Tonawanda, N. Y.

Adsco Dual—Traps. American District Steam Co., North Tonawanda, N. Y.

Adsco Rotary—Condensation meters. American District Steam Co., North Tonawanda, N. Y.

Aemco—Relays, switches. Automatic Electric Mfg. Co., Mankato, Minn.

Aeracool—Blades, fans, louvers and shutters, ventilators. Myers Electric Co., Inc., Pittsburgh, Pa.

Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Aero—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero—Radiation, convector enclosures. National Radiator Co., The, Johnstown, Pa.

Aerodyne—Fans. Jeffrey Mfg. Co., Columbus, O.

Aero-Flex—Registers. Auer Register Co., Cleveland, O.

Aerofuse—Air diffusers. Tuttle & Bailey, Inc., New Britain, Conn.

Aeropel—Ventilators. American Blower Corp., Detroit, Mich.

Aeroplane—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.

Aeropull—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero Seal—Packing. Chicago Belting Co., Chicago, Ill.

Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.

Aerotec—Cleaners, collectors, separators, switches, valves. Thermix Corp., The, Greenwich, Conn.

Aerovane—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.

Afco—Fans, furnaces, heaters. American Furnace Co., St. Louis, Mo.

Affco—Louvers and shutters. American Foundry & Furnace Co., Bloomington, Ill.

Agastat—Time switches, electrical relays. American Gas Accumulator Co., Elizabeth, N. J.

Agile—Welding electrodes. American Agile Corp., Cleveland, O.

Agitair—Air diffusers, dampers, filters, grilles, heaters, ventilators. Air Devices, Inc., New York, N. Y.

Airacoustic—Insulation. Johns-Manville, New York, N. Y.

Air-aid—Air freshening compound. Air Correctives Inc., New York, N. Y.

Airate—Ventilators. Dickinson, Aeolus, Chicago, Ill.

Airco—Arc welders, welding rod, solder, pipe cutting machines. Air Reduction Sales Co., New York, N. Y.

Air Control—Fans, heaters, unit air conditioners. Hastings Air Conditioning Co., Hastings, Neb.

Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Aircor—Filters. Air Filter Corp., Milwaukee, Wis.

Airdfin—Heat exchangers. J. F. Pritchard & Co., Kansas City, Mo.

Airefiner—Water treatment. Oakite Products, Inc., New York, N. Y.

Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.

Air-Fan—Window ventilator units. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Air-flo—Dampers, louvers and shutters. Air Conditioning Products Co., Detroit, Mich.

Air-flo—Ventilators. Dickinson, Aeolus, Chicago, Ill.

Air Flow—Fans. Goettl Bros. Metal Prod. Co., Phoenix, Ariz.

Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.

Airgraph—Thermometers. Hausman Mfg. & Sales Co., Chicago, Ill.

Airguide—Hygrometers, thermometers. Fee and Stemwedel, Inc., Chicago, Ill.

Air Guide—Vanes. Titus Mfg. Corp., Waterloo, Ia.

Air Guide—Radiation. Rempe Co., Chicago, Ill.

Airheater—Unit heaters. Airtherm Mfg. Co., St. Louis, Mo.

Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Airidge—Ventilators. Dickinson, Aeolus, Chicago, Ill.

Airistocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.

Airjector—Ventilators. Swartwout Co., Cleveland, O.

Airmat Arrester—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.

Air Meter—Air velocity meters. Hastings Instrument Co., Hampton, Va.

Airmixt—Gas and oil burners. Williams, Inc., F. C., Dearborn, Mich.

Airmover—Ventilators. Swartwout Co., Cleveland, O.

Airocool—Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airo-Flex—Registers. Auer Register Co., Cleveland, O.

Airoil—Oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Air-o-Line—Indicator-controllers, recorder-controllers. Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Air-O-Line—Pumps, valves. Beckett & Co., Inc., Thomas, Dallas, Tex.

Air-O-Matic—Refrigerating machines, air conditioning units. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.

Airotherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.

Airotor—Blower wheels. Torrington Mfg. Co., Torrington, Conn.

Airout—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Airovent—Gas Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airstat — Regulators. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Airstream—Blower wheels, fans. Morrison Products, Inc., Cleveland, O.

Airswitch—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Airtron—Ducts and duct fittings, hose, insulation. Arrowhead Rubber Co., Los Angeles, Calif.

Air-Tumbler—Dust collectors. Dust Suppression & Engineering Co., Lake Orion, Mich.

Airturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.

Airvalve—Ventilators. Swartwout Co., Cleveland, O.

Air-Van—Ventilators. The Gallaher Co., Owatonna, Minn.

Air Vane—Grilles, registers. Rock Island Register Co., Rock Island, Ill.

Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.

Ajax—Gaskets, United States Gasket Co., Camden, N. J.

Akon—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.

Akwatrol—Electrolytic devices, Scale removal service, Steam treatment. Apex Engineering Co., Chicago, Ill.

Alcalex—Water softeners. Research Products Corp., Madison, Wis.

Alco—Ventilators. Lumm Co., A. H., Toledo, O.

Alcoa — Angles, dehydrators, electrodes, exchangers, pipe, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.

Algaecide—Water treatment. Western Chemical Co., Kansas City, Mo.

Alkacite—Protective coatings. Protective Coatings, Inc., Detroit, Mich.

All-Flex—Pipe joints. Snyder Sales Corp., Los Angeles, Calif.

All-In-One—Regulators. Bell & Gossett Co., Morton Grove, Ill.

Allspeed Selector—Mechanical changers. Worthington Pump & Machinery Corp., Harrison, N. J.

Alnor—Anemometers, dewpoint instrument, indicator controllers, thermometers. Illinois Testing Laboratories, Chicago, Ill.

Alodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Aloyco—Stainless steel fittings, nipples, pipe, tubing, unions, valves. Alloy Steel Products Co., Linden, N. J.

Alternarc—Arc welders. Electric Arc, Inc., Newark, N. J.

Alumaweld—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Always Reliable—Benders, cutters, torches, wrenches. Bernz Co., Otto, Rochester, N. Y.

Amblerex—Insulating cement. Keasbey & Mattison Co., Ambler, Pa.

Amco—Galvanizing powder. American Solder & Flux Co., Philadelphia, Pa.

Amco—Humidifiers. Grinnell Co., Inc., Providence, R. I.

Amco—Humidifiers, humidistats, hygrometers. American Moistening Co., Providence, R. I.

Amco—Gaskets, packing. Austin-Mason Co., New York, N. Y.

Amcoil—Condensers, radiation, cooling and heating surfaces. American Coils Co., Newark, N. J.

American—Absorbers, metal hose, vibration eliminators. American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.

American—Couplings. American Flexible Coupling Co., Erie, Pa.

American—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.

American—Recorders, thermometers. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

American—Meters. American Meter Co., Inc., New York, N. Y.

American—Speed reducers. American Pulley Co., Philadelphia, Pa.

American—Vibration eliminators. American Metal Hose Branch, American Brass Co., Waterbury, Conn.

American—Pumps, softeners, water filters, water treatment. American Well Works, Aurora, Ill.

American—Pipe benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.

American—Convector enclosures, radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Empire—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Exbrook Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Redflash—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Standard—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Water Tube—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh Pa.
Amerigear—Couplings. American Flexible Coupling Co., Erie, Pa.
Ameritherm—Heaters, air conditioning units. American Thermal Industries, Detroit, Mich.
Ames—Pumps. Domestic Engine & Pump Co., Shippensburg, Pa.
Amesteam—Boilers. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Aminco Climatizer—Test chambers. American Instrument Co., Silver Spring, Md.
Ampac—Arc welders. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Am-Pe-Co—Centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Amtico—Heaters, air conditioning units. American Thermal Industries, Detroit, Mich.
Anaconda—Fittings, pipe, welding rod, sheets, solder, tubing, valves. American Brass Co., Waterbury, Conn.
Anchorjoint—Joints. Magnalastic Div., Cook Electric Co., Chicago, Ill.
Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.
Anthracite 1600—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Anti-Sweat—Insulation. Johns-Manville, New York, N. Y.
Apeco—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.
Apex—Analyzers, recorders, indicators. Uehling Instrument Co., Paterson, N. J.
Apex—Regulators, dampers. Ohio Products Co., Cleveland, O.
Apexior—Coatings. Dampney Co. of America, Boston, Mass.
Aqua-Clear—Water treatment. Sudbury Laboratory, South Sudbury, Mass.
Aqua-Fin—Radiation. Auburn Burner Co., Auburn, Ind.
AquaHeater—Heaters. Lewis & Co., Joseph E., Baltimore, Md.
Aqualator—Circulators. Triplex Mfg. Co., Inc., Peru, Ind.
Aquamizer—Condensers. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Aqua-Tite—Seals. Schwitzer-Cummins Co., Indianapolis, Ind.
Aquatone—Treatment, steam and water. Ampion Corp., Long Island City, N. Y.
Aquatrol—Boiler cleaning compounds and water treatment. Aquatic Chemical Laboratories, Inc., New York, N. Y.
Aqulux—Heaters. Johnson Co., S. T., Philadelphia, Pa.
Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Arc-Heat—Burners. American Heat Corp., Boston, Mass.
Arco—Hangers, radiation, regulators, valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arco Packless—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arctic Circle—Air conditioning units. Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.
Aridifier—Separators. Logan Engineering Co., Chicago, Ill.
Arin—Louvers and shutters. Arex Co., Chicago, Ill.
Armorak—Insulation. Keasbey Co., Robert A., New York, N. Y.
Arrestone—Insulation. Armstrong Cork Co., Lancaster, Pa.
Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Art—Direct radiation. The National Radiator Co., Johnstown, Pa.
Artic—Refrigerants. du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington, Del.
Asbestocel—Insulation. Johns-Manville, New York, N. Y.
Asco—Valves, relays, switches. Automatic Switch Co., Orange, N. J.
Ashcroft—Gages, recorders, testers. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.
Athol—Pipe fittings, unions. Leavitt Machine Co., Orange, Mass.
Atlas—Fans, furnaces, heaters, International Sales Co., San Francisco, Calif.
Atomick—Humidifiers, nozzles. Maid-'O-Mist, Inc., Chicago, Ill.
Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.
Atticvane—Fans. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Auditone—Insulation. United States Gypsum Co., Chicago, Ill.
Autocrat—Oil burners. Chandler Co., Cedar Rapids, Ia.
Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Autolite—Gages, gage glasses, recorders, thermometers. Electric Autolite Co., Instrument & Gauge Div., Toledo, O.
Autolube—Bearings. International Powder Metallurgy, Inc., Ridgway, Pa.
Automatic Heat—Heaters. Heat Equipment not Inc., Chicago, Ill.
Auto-Tite—Pipe couplings. Superior Railway Products Corp., Pittsburgh, Pa.
Autovent—Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Autozone—Zone control unit. Tallmadge & Co., Webster, East Orange, N. J.
Axiflo—Propeller fans. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Axiom—Filters. Blocksom & Co., Michigan City, Ind.
Axivane—Fans. Joy Mfg. Co., Pittsburgh, Pa.

B.A.C.—Condensers. Baltimore Aircoil Co., Inc., Baltimore, Md.
B. B.—Blast gates. Berger Bros. Co., Philadelphia, Pa.
B & B—Heating and air conditioning equipment. Bishop & Babcock Mfg. Co., Cleveland, O.
B & C—Plates. Beaton & Corbin Mfg. Co., Southington, Conn.
BCA—Bearings. Bearings Co. of America, Lancaster, Pa.
B. & G.—Air eliminators, circulators, coolers, condensers, fittings, hangers, heat exchangers, heaters, regulators, tanks, thermostats, valves. Bell & Gossett Co., Morton Grove, Ill.
B-H—Insulation. Baldwin-Hill Co., Trenton, N. J.
B-H No. 1—Insulating cement. Baldwin-Hill Co., Trenton, N. J.
B-H No. 100—Pipe insulation. Baldwin-Hill Co., Trenton, N. J.
B & K—Pipe cutting and threading machines. Bignall & Keeler, Div., John Ramming Machine Co., St. Louis, Mo.
B-Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
B & W—Boilers, burners, desuperheaters, fuel economizers, heat exchangers, insulating cement, refractories, stokers, superheaters, valves. Babcock & Wilcox Co., New York, N. Y.
B & W—Pipe and tubing. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
B & W—Tubing. Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacite—Insulation. Bird-Archer Co., Philadelphia, Pa.
Baco—Cleaning compounds, refractories. Bird-Archer Co., Philadelphia, Pa.
Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.
Baflex—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Balancer—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Baldwin-Rex—Couplings, chain drives. Chain Belt Co., Milwaukee, Wis.
Balsam-Wool—Insulation. Wood Conversion Co., St. Paul, Minn.
Bankheat—Oil burners. Johnson Co., S. T., Philadelphia, Pa.
Barcol—Humidistats, motors, operators, regulators, thermostats, valves. Barber-Colman Co., Rockford, Ill.
Barnes—Cutters. Erie Tool Works, Erie, Pa.
Barreled Sunlight—Enamels. U.S. Gutta Percha Paint Co., Providence, R. I.
Barry—Bearings, pulleys and sheaves. Dick Co., Inc., R. & J., Passaic, N. J.
Bar-Stock—Valves. Reading Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Barton-American — Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Base Ray—Baseboard radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Basifrit—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Beacor—Valves. Beaton & Corbin Mfg. Co., Southington, Conn.
Beauticast—Radiation. Columbia Radiator Co., McKeesport, Pa.
Beaverkill—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Beco-Cell—Corrosion treatment. Brown-Electro Co., Oklahoma City, Okla.
Belco—Fans, louvers and shutters. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bellowseal—Gaskets. Johns-Manville, New York, N. Y.
Bell-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Benco—Oil burners. Bennett Co., Omaha, Neb.
Benda Vane—Grilles. Rock Island Register Co., Rock Island, Ill.
Bend-Ezy—Grilles, registers. Standard Stamping & Perforating Co., Chicago, Ill.
Bendmaster—Tubing benders. Leonard Precision Products Co., Garden Grove, Calif.
Bestfelt—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bi-Air—Burners. John Zink Co., Tulsa, Okla.
Bifurcator—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Bildrite—Insulation. Insulite Co., Minneapolis, Minn.
Bi-Mix—Burners. John Zink Co., Tulsa, Okla.
Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Bison—Boilers. Farrar & Trefts, Buffalo, N. Y.
Bitumastic—Protective coatings. Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Bituminous—Coatings. Robertson Co., H. H., Pittsburgh, Pa.
Bituplastic—Coatings. Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Black Baking Japans—Enamels and lacquers Hilo Varnish Co., Brooklyn, N. Y.
Black Magic—Welding compounds. Universal Power Corp., Cleveland, O.
Black Magic—Cement and compounds. Bowser, Inc., Fort Wayne, Ind.
Blazecrete—Refractories. Johns-Manville, New York, N. Y.
Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.
Blo-Cold—Unit coolers. Acme Industries, Inc., Jackson, Mich.
Bloflex—Hose. American Ventilating Hose Co., New York, N. Y.
Blowertrol—Speed changers. White Mfg. Co., St. Paul, Minn.
Blu-Cold—Compressors. Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Blueknight—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Blue-Point—Tools, wrenches. Snap-on Tools Corp., Kenosha, Wis.
Blue Ribbon—Headers and nipples. Chicago Nipple Mfg. Co., Cicero, Ill.
Blue Streak—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Boardman—Pump governors. Locke Regulator Co., Salem, Mass.
Boilergard—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Boiler Solder Seal—Compounds. Radiator Specialty Co., Charlotte, N. Carolina.
Boylout—Cleaning compounds, steam treatment. Apex Engineering Co., Chicago, Ill.
Branford—Oil burners, unions. Malleable Iron Fittings Co., Branford, Conn.
Brassweld—Compounds. Sight Feed Generator Co., Richmond, Ind.
Brazarc—Electrodes. Universal Power Corp., Cleveland, O.
Brazo—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Breeze Spreader—Propeller fans. Victor Electric Products, Inc., Cincinnati, O.
Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.
BRI Gun—Refractories and refractory cement Basic Refractories, Inc., Cleveland, O.
Bro-For—Boiler compounds. Brown-Ford Corp., Newton, Mass.
Brommell—Eliminators, floats, heating systems, traps, valves. Vapor Specialty Co., New York, N. Y.
Brommweld—Finned tubing. Brown Fintube Co., The, Elyria, O.
Bronzende—Electrodes. Arcos Corp., Philadelphia, Pa.
Bronzeweld—Compounds. Sight Feed Generator Co., Richmond, Ind.
BTUnit—Unit heaters. Industrial Mfg. & Engineering Co., Chicago, Ill.
Budget—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bulator—Grilles. Hendrick Mfg. Co., Carbondale, Pa.
Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Bull Dog—Pipe and tubing. Phelps Dodge Copper Products, British American Tube Div., New York, N. Y.
Bull Dog—Valves. The Carpenter Mfg. Corp., Cleveland, O.
Bundyflex—Steel tubing. Everhot Products Co., Chicago, Ill.
Bundyweld—Tubes and tubing. Bundy Tubing Co., Detroit, Mich.
Bunker Hill—Fittings, pipe, sheets, solder. Northwest Lead Co., Seattle, Wash.
Burks—Pumps. Decatur Pump Co., Decatur, Ill.
Burnham—Compressors. condensers, pumps. Union Steam Pump Co., Battle Creek, Mich.

C-E—Boilers, burners, stokers, fuel economizers. Combustion Engineering Co., New York, N. Y.
C-H—Alarms, controllers and starters, heaters, relays, regulators, switches, valves. Cutler-Hammer, Inc., Milwaukee, Wis.
CJB—Bearings. Ahlberg Bearing Co., Chicago, Ill.
C & M—Hangers or brackets. Carty & Moore Engineering Co., Detroit, Mich.
CMH—Bellows, pipe joints. Chicago Metal Hose Corp., Maywood, Ill.
COM—Blowers. Wing Mfg. Co., L. J., New York, N. Y.
C & R—Regulators. Automatic Control Co., St. Paul, Minn.
CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Cadillac—Meters. Central Station Steam Co., Detroit, Mich.
Cadman—Valves. Barrett Machine Co., N. S., Pittsburgh, Pa.
Cadwell—Pressure regulators, valves. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Calco—Valves. California Brass Mfg. Co., Los Angeles, Calif.
Calk-N-Seal—Caulking compounds. Blue Ridge Talc Co., Inc., Henry, Va.

Calktite—Cement and compounds. U. S. Stoneware Co., New York, N. Y.
Calorex—Oil burners. W. N. Best Combustion Equipment Co., Inc., New York, N. Y.
Cantilever—Hygrometers. Standard Thermometer, Inc., Boston, Mass.
Capacilogs—Temperature recorders. Wheelco Instruments Co., Chicago, Ill.
Capacitrols—Indicator-controllers. Wheelco Instruments Co., Chicago, Ill.
Capillary—Air washers. American Blower Corp., Detroit, Mich.
Capillary—Air washers. Clarage Fan Co., Kalamazoo, Mich.
Capillary—Air washers, dehumidifiers, humidifiers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.
Capitol—Insulation. Standard Lime & Stone Co., Baltimore, Md.
Carbolite—Soot destroyers. Ampion Corp., Long Island City, N. Y.
Careyduct—Ducts and duct fittings, insulation, non-metallic sheets, duct turning vanes. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Carstenite—Insulators. Technical Plywoods, Chicago, Ill.
Cash-Acme—Heating systems, pipe strainers, regulators, valves. Cash Valve Mfg. Co., A. W., Decatur, Ill.
Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.
Castirnarc—Electrodes. Universal Power Corp., Cleveland, O.
Cast-Refract—Refractories. Quigley Co., Inc., New York, N. Y.
Catch-All—Dehydrators. Sporlan Valve Co., St. Louis, Mo.
Causul—Valves. Lunkenheimer Co., Cincinnati, O.
Cauxeal—Compounds. X-Pando Corp., Long Island City, N. Y.
Celeron—Couplings, fittings. Continental Diamond Fibre Co., Newark, Del.
Cell-U-Blanket—Insulation. Masonite Corp., Chicago, Ill.
Cellufoam—Insulation. Masonite Corp., Chicago, Ill.
Celo-Siding—Insulation. Celotex Corp., The, Chicago, Ill.
Cemcoat—Enamels and lacquers. Sonneborn Sons, Inc., New York, N. Y.
Cementseal—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Cemesto—Insulation. Celotex Corp., The, Chicago, Ill.
Central—Conduit. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Centrimax—Meters. Leeds & Northrup Co., Philadelphia, Pa.
Centripac—Packing. Johns-Manville, New York, N. Y.
Centripeller—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Chaco—Cement and compounds, boiler and radiator sealing compounds. Desolvo Co., The, Pittsburgh, Pa.
Champion—Furnaces, heaters. National Heater Co., St. Paul, Minn.
Champion—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Champion—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Chan-L-Mounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Chem-o-Feeder. Feeders, pumps, steam system and water treatment. % Proportioneers, Inc., % Providence, R. I.
Chevron—Packing. Garlock Packing Co., Palmyra, N. Y.
Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago, Ill.
Chicago—Stokers. Eddy Stoker Corp., Chicago, Ill.
Chicago-Wrigley—Bolts. Chicago Expansion Bolt Co., Chicago, Ill.
Chico Brikset—Cement. Chicago Fire Brick Co., Chicago, Ill.
Chieftain—Compressors. Tecumseh Products Co., Tecumseh, Mich.
Chill Air—Air conditioning units. National Engineering & Mfg. Co., Kansas City, Mo.
Chill-Vactor—Chillers and steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Chimney Sweep—Chemical destroyers. Coughlan Co., G. N., West Orange, N. J.
Chinook—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chinookfin—Non-ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chore Boy—Burners. Standard Fuel & Engineering Co., Detroit, Mich.
Chromalox—Preheaters, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Chromang—Electrodes. Arcos Corp., Philadelphia, Pa.
Chrome Lock—Gaskets. Products Research Co., Los Angeles, Calif.
Chromend—Electrodes. Arcos Corp., Philadelphia, Pa.
Chromeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Chromix—Refractories. Quigley Co., Inc., New York, N. Y.
Chronoflo—Flow meters, recorders. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chronometer—Valves. Defender Instrument & Regulator Co., St. Louis, Mo.
Chronotherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Cinch—Expansion bolts. National Lead Co., New York, N. Y.
Circle T—Switches. Trumbull Electric Co., The, Plainville, Conn.
Circo—Louvres and shutters, fan housings. Circulators & Devices Mfg. Co., New York, N. Y.
Clair-Bond—Adhesives. St. Clair Rubber Co., Detroit, Mich.
Clamp-A-Leak—Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.
Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Classic—Registers. Auer Register Co., Cleveland, O.
Cle-Bar—Heaters. Cleghorn Co., Boston, Mass.
Clevita—Bearings. Cleveland Graphite Bronze Co., Cleveland, O.
Cliff—Boilers, water heaters. Terre Haute Boiler Works Co., Terre Haute, Ind.
Climate Changer—Unit air conditioners, unit air coolers. Trane Co., The, La Crosse, Wis.
Climatrol—Boilers, furnaces, heaters, fans, metallic ducts. Mueller Furnace Co., L. J., Milwaukee, Wis.
Clipper—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Clipper—Seals. Johns-Manville, New York, N. Y.
Closin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Cocheo—Belting. Williams & Son, I. B., Dover, N. H.
Colalloy—Couplings, fittings, flanges, nipples, pipe. Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Cold Stream—Unit air conditioners. Baker Ice Machine Co., Inc., South Windham, Me.
Coltemp—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Columbia—Odor adsorbers. Carbide and Carbon Chemicals Corp., New York, N. Y.
Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.
Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.
Comet—Fans, unit heaters. New York Blower Co., Chicago, Ill.
Comfort-Air—Air washers. Comfort Products Corp., Dallas, Tex.
Comfort Panel—Radiation. Columbus Radiator Co., McKeesport, Pa.
Comfortrol—Switches. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.
Co-Min-Co—Insulating cement. United States Mineral Wool Co., South Milwaukee, Wis.
Compact-Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.
Conco—Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.
Condor—Belting, V belts, pipe. Raybestos-Manhattan, Inc., Passaic, N. J.
Condo-Vac—Vacuum pumps. Chicago Pump Co., Chicago, Ill.
Congress—Switches. Congress Fan & Electric Co., Daytona Beach, Fla
Coni-Vane—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Conseco—Water chillers, tube cleaners, coils, compressors, condensers, oil coolers, dryers, heat exchangers, filters, headers, water heaters, joints, preheaters, pumps, chemical service for scale removal, separators, superheaters, tanks, cooling towers. Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated—Valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Con-Tac-Tor—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Convect-O-Base—Baseboard radiation. Minimite Co., Chicago, Ill.
Convect-O-Fin—Fin tube radiation, tubing, Minimite Co., Chicago, Ill.
Convector—Humidifiers. Maid-O'-Mist., Inc., Chicago, Ill.
Conveyoflo — Conveyors. Builders-Providence, Inc., Providence, R. I.
Conveyor—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Coolair—Fans, louvers and shutters, ventilators, ventilator units. American Coolair Corp., Jacksonville, Fla.
Cooleraire—Air conditioning units. Payne Furnace Co., Beverly Hills, Calif.
Coolero—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Coolite—Windows. Mississippi Glass Co., New York, N. Y.
Cool Master—Fans. Air Equipment Co., Chicago, Ill.
Coolmaster—Unit coolers. Kramer Trenton Co., Trenton, N. J.
Copaltite—Cement and compounds, gaskets. National Engineering Products, Inc., Washington, D. C.
Copes—Governors, regulators, steam desuperheaters, valves, water alarms. Northern Equipment Co., Erie, Pa.
Cop-R-Loy—Sheets. Wheeling Steel Corp., Wheeling, W. Va.
Copr-Tube—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Coravol—Corrosion treatment. Western Chemical Co., Kansas City, Mo.
Corkhoustic—Insulation. Armstrong Cork Co., Lancaster, Pa.
Cornelius—Air compressors and regulators. North Penn Co., New York, N. Y.
Corosex—Water treatment. Research Products Corp., Madison, Wis.
Corozone—Ionization and ozone apparatus. Coroaire Heater Corp., The, Cleveland, O.
Corrodicide—Water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Corrodine—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Cotoid—Coatings. Lithgow Corp., Chicago, Ill.
Cottrell—Dust collectors. Research Corp., New York, N. Y.
Cottrell—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Co-Z-Air—Electric radiators. Morton-Gregory Corp., Toledo, O.
Crescent—Boiler gage cocks, Wright-Austin Co., Detroit, Mich.
Crescent—Unions. Star Mfg. Co., Inc., Providence, R. I.
Crescent—Valves. Powell Co., Wm., Cincinnati, O.
Croloy—Pipe. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Cromaloy—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Cross-Flo—Dehydrators. Remco, Inc., Zelienople, Pa.
Crown—Cement and compounds. Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Crystals—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Cushion-Cradled—Burners. Century Engineering Corp., Cedar Rapids, Ia.
Cushiontone—Insulation. Armstrong Cork Co., Lancaster, Pa.
Cut Master—Vertical turret lathes. Bullard Co., The, Bridgeport, Conn.
Cutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Cycloidal—Air washers. Blower Application Co., Milwaukee, Wis.
Cycoil—Filters. American Air Filter Co., Louisville, Ky.
Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.
Cyclops—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.

DFN—Dehydrators, filters. McIntire Connector Co., Newark, N. J.
DH—Ball bearings. Dodge Mfg. Corp., Mishawaka, Ind.
D & H—Evaporative condensers, cooling and heating surfaces, unit air conditioners. Drayer & Hanson, Inc., Los Angeles, Calif.
D.I.P.—Insulation, piping. Durant Insulated Pipe Co., Palo Alto, Calif.
DV—Speed changers, v-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.
Damit—Caulking compounds. Quigley Co., Inc., New York, N. Y.
Daptoblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Dart—Unions. Fairbanks Co., New York, N. Y.
Dawnblast—Unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Day-Nite Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Day-Steel—Pulleys. Dayton Rubber Co., Dayton, O.
Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.
Debecote—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Deflecto-Grilles—Grilles. United States Air Conditioning Corp., Minneapolis, Minn.
Demandtrol—Valves. Gold Top Heating, Inc., Butte, Mont.
Demon Air-Set—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Dereka—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.
Desert Air—Heaters, burners. Central States Mfg. Co., Inc., Arkansas City, Kan.
Desmond-Simplex—Pipe vises. Desmond-Stephan Mfg. Co., Urbana, O.
De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.
Detroit—Traps. Nason Co., Detroit, Mich.
Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Rotograte Stoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Rotostoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Unistoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Dexter—Valve reseaters, air separators, steam traps. Leavitt Machine Co., Orange, Mass.
Di-Acro—Benders, brakes, shears. O'Neil Irwin Mfg. Co., Lake City, Minn.
Dialon—Radiator valves, Bridgeport Brass Co., Bridgeport, Conn.
Diamond—Compounds, enamels and lacquers. Thompson & Co., Oakmont, Pa.
Diamond Fibre—Gaskets. Continental Diamond Fibre Co., Newark, Del.

Diamond H—Switches, thermostats, regulators. Hart Mfg. Co., Hartford, Conn.
Diaphlex—Controls. Cook Electric Co., Diaphlex Div., Chicago, Ill.
Dickbelt—Belting and drives. Dick Co., Inc., R. & J., Passaic, N. J.
Dickinson Ferrocast—Exhaust heads, ventilators. Dickinson, Aeolus, Chicago, Ill.
Dickrope—V belts and drives. Dick Co., Inc., R. & J., Passaic, N. J.
Dickvalve—Valves. Dick Co., Inc., R. & J., Passaic, N. J.
Dieselite—Corrosion prevention. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Difr-enshal-Vacm—Heating systems. Dunham Co., C. A., Chicago, Ill.
Dike—Furnace cement. Klee Co., Geo. B., Cincinnati, O.
Dilecto—Plastic pipe. Continental Diamond Fibre Co., Newark, Del.
Direct—Pipe fittings and flanges, separators, strainers. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Directrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Discfin—Cooling surface. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Disc-Loc—Registers. Knowles Mushroom Ventilator Co., Montclair, N. J.
Disseminator—Compounds. Ampion Corp., Long Island City, N. Y.
Distributor—Radiation. Kehm Corp., The, Chicago, Ill.
Divco—Pipe and tubing, sheets. Division Lead Co., Chicago, Ill.
Dixielectric—Boilers. Livingstone Engineering Co., Worcester, Mass.
Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.
Dixisteel—Pipe hangers and supports. Atlantic Steel Co., Atlanta, Ga.
Do-All—Combination hammer and drill. Wodack Electric Tool Corp., Chicago, Ill.
Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.
Dorex—Adsorbers. W. B. Connor Engineering Corp., New York, N. Y.
Double Check—Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.
Double Diamond—Hygrometers, recorders, psychrometers. H-B Instrument Co., Philadelphia, Pa.
Double Duty—Compounds. Tamms Silica Co., Chicago, Ill.
Double-Seal—Copper tube fittings. Hays Mfg. Co., Erie, Pa.
Double U—Packing. Wayne Davies & Co., Westboro, Mass.
Dowmetal—Sheets, structural shapes, tubing, welding rod. Dow Chemical Co., Midland, Mich.
Downblast—Unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Down Flow—Unit heaters. McQuay, Inc., Minneapolis, Minn.
Dowtherm—Process heating systems. Dow Chemical Co., The, Midland, Mich.
Draft-A-Justor—Draft controls. Preferred Utilities Mfg. Corp., New York, N. Y.
Draft-O-Stat—Barometric controls. Hotstream Heater Co., Cleveland, O.
Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Draftrite—Gages. Cole-Sewell Engineering Co., St. Paul, Minn.
Drainator—Traps. Coe Mfg. Co., Painesville, O.
Drain-Dri—Sump pumps. Yeomans Bros. Co., Chicago, Ill.
Draintrol—Traps. Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Dresserell—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
DriAir—Dehumidifiers, Tamms Silica Co., Chicago, Ill.
Drift Retriever—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Dri-Pipe—Insulation. Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
Drive-IT—Hangers and supports, welders. Powder Power Tool Corp., Portland, Ore.
Dri-vent—Radiator air valves. Frank D. Riggio Co., Rutherford, N. J.
Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.
Dry-Ice—Refrigerants. Pure Carbonic, Inc., New York, N. Y.
Drynamic—Dehumidifiers. Cargocaire Engineering Corp., New York, N. Y.
Dry-paC—Insulation. Ric-wiL Co., Cleveland, O.
Dryvin—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Dualarc—Arc Welders. Electric Arc, Inc., Newark, N. J.
Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.
Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.
Duboth—Boiler water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Duco—Enamels and lacquers. du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept. Wilmington, Del.
Ductatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Ducturns—Vanes. Tuttle & Bailey, Inc., New Britain, Conn.
Ductype—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dulrae—Electrical radiant heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Dulux—Enamels and lacquers. du Pont de Nemours & Co. (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.
Duo Blo—Furnaces. American Furnace Co., St. Louis, Mo.
Duoflo—Pipe line strainers. Sheffler-Gross Co., Philadelphia, Pa.
Duo-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Duotrol—Regulators. Automatic Control Co., St. Paul, Minn.
Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Duplex—Pipe cutting machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Duplex—Pipe line strainers. Maid-O'-Mist, Inc., Chicago, Ill.
Duplex—Tubing. Bridgeport Brass Co., Bridgeport, Conn.
Durabel—Coatings. Perolin Co., Inc., Chicago, Ill.
Durabilt—Observation ports. Chicago Fire Brick Co., Chicago, Ill.
DuraBilt—Registers. Auer Register Co., Cleveland, O.
Duradiant—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Dura-Flex—Registers. Auer Register Co., Cleveland, O.
Duraflex—Stokers. Canton Stoker Corp., Canton, O.
Dura-Line—Registers. Auer Register Co., Cleveland, O.
Duranite—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
DuraSpeed—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Duratex—Protective coatings. National Pipe Coatings, Inc., Los Angeles, Calif.
Durco—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durcopump—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durex—Bearings. Moraine Products Div., General Motors Corp., Dayton, O.
Durichlor—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Duridine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Durimet—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durobrace—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Duro Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Duroplastic—Caulking compounds. Acorn Refining Co., Cleveland, O.
Dustex—Dust collectors. Dust Filter Co., Chicago, Ill.
Dustkop—Dust collectors. Aget-Detroit Co., Ann Arbor, Mich.
Dust-Stop—Air Filters. Owens-Corning Fiberglas Corp., Toledo, O.
Dustube—Dust collectors. American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Dutch Boy—Solder. National Lead Co., New York, N. Y.
Duxbak—Leather belting and packing. Schieren Co., Chas. A., New York, N. Y.
Dux-Sulation—Insulation. Wilson Inc., Grant, Chicago, Ill.
Dynaflow—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dynamaster—Recorders. Bristol Co., The, Waterbury, Conn.
Dynatherm—Water heaters. Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.

E.A.D.—Motors. Eastern Air Devices, Inc., Brooklyn, N. Y.
E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.
E C & M—Motor controls, solenoids, switches. Electric Controller & Mfg. Co., Cleveland, O.
EMD—Blowers. L. J. Wing Mfg. Co., New York, N. Y.
E.Z.—Hangers or brackets, soot destroyers. Healy Ruff Co., St. Paul, Minn.
Eastern—Tanks. Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Easy-Flo—Solder. Handy & Harman, New York, N. Y.
Easyweld—Electrodes. Universal Power Corp., Cleveland, O.
Ebko—Conduit, jacketed and lined piping, joints. Kaiser Co., E. B., Chicago, Ill.
Eclipse—Hose. Bendix Aviation Corp., Eclipse-Pioneer Div., Peterboro, N. J.
Econolux—Boilers. Johnson Co., S. T., Philadelphia, Pa.
Econ-o-matic—Bases. American Pulley Co., Philadelphia, Pa.
Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.
Economy—Boilers, heaters. International Heater Co., Utica, N. Y.
Economy—Regulators. Dockson Corp., Detroit, Mich.
Economy—Unit ventilators. Arex Co., Chicago, Ill.
Econostat—Heating systems. Barber-Colman Co., Rockford, Ill.
Econovent—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.
Edgeseal—Air filters. Wilson & Co., Inc., Chicago, Ill.
Efco—Heat exchangers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Effecto-Grille—Grilles, registers. Turnbull Mfg. & Dist. Co., Detroit, Mich.
Effico—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Ehret's D.I.P.—Pipe. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
"88"—Pipe covering. Eagle-Picher Co., Cincinnati, O.
88-A—Pipe vise stands. Nye Tool & Machine Co., Chicago, Ill.
Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.
Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.
Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electro-Airmat—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Cell—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electroflo—Valves. Hays Mfg. Co., Erie, Pa.
Electrofluid—Hydraulic speed changers. Link-Belt Co., Philadelphia, Pa.
Electro-Hot—Heaters. Red Spot Electric Co., Tacoma, Wash.
Electro-Matic—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Mist Collector—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.
Electroweld—Welders. Electric Arc., Inc., Newark, N. J.
Electro-Wind—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Electrunite—Stainless steel tubing. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Elesco—Superheaters. Combustion Engineering Co., Inc., New York, N. Y.
Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.
Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.
Elgin—Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elite—Registers. Auer Register Co., Cleveland, O.
Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elsco—Blowers, compressors, pumps, valves. Electric Sprayit Co., The, Sheboygan, Wis.
Embee—Cement and compounds. Montgomery Bros., San Francisco, Calif.
Emco—Meters, regulators. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Enamel-Kote—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Enco—Burners, regulators. Engineer Co., New York, N. Y.
Enduro—Sheets, tubing. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Enduro—Unions. Jefferson Union Co., Inc., New York, N. Y.
Enpo—Motors, pumps. Piqua Machine & Mfg. Co., Piqua, O.
Entrained Combustion—Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Equatherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.
Equiflo—Valves. Grinnell Co., Inc., Providence, R. I.
Eroduct—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Erwin—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Esna—Nuts. Elastic Stop Nut Corp. of America, Union, N. J.
Esso—Oil burners, heaters. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Esso Bond—Cement, refractories. Ramtite Co., The, Chicago, Ill.
Eureka—Valves. Ohio Pattern Wks. & Foundry Co., Eureka Valve Div., Cincinnati, O.
Eutecrod—Welding electrodes. Eutectic Welding Alloys Corp., New York, N. Y.
Eutectrode—Welding electrodes. Eutectic Welding Alloys Corp., New York, N. Y.
Evactor—Pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evapotrol—Valves. Alco Valve Co., St. Louis, Mo.
Evanaction—Valves. Taylor Instrument Companies, Rochester, N. Y
Everflex—Hose, coils, and tubing. Everhot Products Co., Chicago, Ill.
Everjet—Coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Everlasting—Bolts and studs. H. M. Harper Co., Chicago, Ill.
Eversharp—Cutters. Everhot Products Co., Chicago, Ill.
Evertite—Clamps. Everhot Products Co., Chicago, Ill.
Everwear—Ventilators. Southern States Iron Roofing Co., Savannah, Ga.

Evrtyte—Valves. Strong, Carlisle & Hammond Co., Cleveland, O.
Excel—Unions. Jefferson Union Co., Inc., New York, N. Y.
Excelsior—Pumps. Foster Pump Works, Inc., Brooklyn, N. Y.
Excelso—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Exhaustair—Fans. New York Blower Co., Chicago, Ill.
Exidust—Dust collectors. Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
Extra Dry Esotoo—Liquid sulphur dioxide. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Gages, indicators. Reliance Gauge Column Co., Cleveland, O.
Ez-arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb.
E-Z-See—Glasses. Remco, Inc., Zelienople, Pa.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.

F & E—Stokers. Flynn & Emrich Co., Baltimore, Md.
FS—Bellows. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
F & T—Boilers. Farrar & Trefts, Buffalo, N. Y.
Fabrikated—Grilles, registers. Independent Register Co., Cleveland, O., New York, N. Y
Faircoseal—Valves. Fairbanks Co., New York, N. Y.
Fan-Air—Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Fan-Pac—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farnsworth—Pumps. O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
Fast's—Couplings. Koppers Co., Inc., Bartlett Hayward Div., Baltimore, Md.
Favorite—Ratchet wrenches. Greene, Tweed & Co., North Wales, Pa.
Featherfin—Heating and cooling surface. Wing Mfg. Co., L. I., New York, N. Y.
Featherweight—Propeller fans. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Featherweight—Unit heaters. Wing Mfg. Co., L. I., New York, N. Y.
Fel-Pro—Gaskets, packing Felt Products Mfg. Co., Chicago, Ill.
Felt Cote—Metal sheets. American Steel Band Co., Pittsburgh, Pa.
Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Boston, Mass.
Fenox—Compounds. Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.
Ferroclad—Insulation. Truscon Steel Company, Youngstown, O.
Ferrodex—Compounds. MacDermid Chemical Co., Bristol, Conn.
Ferro-Therm—Insulation. American Flange & Mfg. Co., New York, N. Y.
Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Fiberglas—Duct connections, tape. Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
Fiberglas—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Fiberlite—Insulation. Insulite Co., Minneapolis, Minn.
Fibron—Plastic tubing. Irvington Varnish & Insulator Co., Irvington, N. J.
5373—Plastic tubing. Irvington Varnish & Insulator Co., Irvington, N. J.
Filmflo—Deaerators. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Filterpure—Cooling surface. Betz Corp., Hammond, Ind.
Fil-Thru—Gages. Applied Mechanics Co., Boston, Mass.
Filt-R-Stil—Water treatment. American Cyanamid & Chemical Corp., New York, N. Y.
Finco—Finned tubing. Fintube Coil Corp., Alhambra, Calif.
Findlay—Stokers. Central Rubber & Steel Corp., Findlay, O.
Fine-Screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.
Fin-Flex—Registers. Auer Register Co., Cleveland, O.
Finfold—Cooling surface. Pleasantaire Corp., Washington, D. C.
Finmaster—Radiation. Smith Co., Inc., H. B., The, Westfield, Mass.
Finntense—Gas burners. Finn Engineers, Jerry, St. Paul, Minn.
Finstrip—Heaters Wiegand Co., Edwin L., Pittsburgh, Pa.
Firecrete—Refractories. Johns-Manville, New York, N. Y.
Fire-Felt — Insulation. Johns-Manville, New York, N. Y.
Firefoil—Insulating panel. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Fire-Guard—Stokers. Peerless Mfg. Corp., Louisville, Ky.
Fire-Hearth—Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Fireite—Furnace cement refractories. Johns-Manville, New York, N. Y.
Fireset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Fire Tender—Stokers. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Fireye—Alarms, flame failure controls, systems, cut-offs, recorders. Combustion Control Corp., Cambridge, Mass.
Firma—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Firomatic—Filters, gages, links, switches, valves. Morse-Smith-Morse, Inc., Watertown, Mass.
Flamebuster—Spray nozzles. Grinnell Co., Inc., Providence, R. I.
Flame Control—Burners. Richfield Mfg. Corp., Baldwin, L. I., N. Y.
Flame-otrol—Controls. Wheelco Instruments Co., Chicago, Ill.
Flange-Jacks—Separators. Williams & Co., J. H., Buffalo, N. Y.
Flaremaster—Benders. Everhot Products Co., Chicago, Ill.
Flash-Off—Welding compounds. Acme White Lead & Color Wks., Detroit, Mich.
Flat-Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Flatjet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.
Fleetwelder—Welders. Lincoln Electric Co., Cleveland, O.
Fleet-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Flexarc—Arc welders. Westinghouse Electric Corp., Pittsburgh, Pa.
Flexaust—Hose. American Ventilating Hose Co., New York, N. Y.
Flexcord—Drives. Gates Rubber Co., Denver, Col.
Flexeal—Gaskets. Johns-Manville, New York N. Y.
Flexfast—Hose clamps. Flexible Tubing Corp., Branford, Conn.
Flexiblac—Protective coatings. Samuel Cabot, Inc., Boston, Mass.
Flexidur—Nozzles. Bahnson Co., Winston-Salem, N. C.
Flexigrip—Fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Flexiwound—Gaskets. Azor Corp., Irvington, N. J.
Flexloc—Lock nuts. Standard Pressed Steel Co., Jenkintown, Pa.
Flexodisc—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Flextite—Gate valves. Ohio Brass Co., Mansfield, O.
Flex-Tube — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Floatrol—Switches, regulators. Automatic Control Co., St. Paul, Minn.
Flo-Controls—Fittings. W-H Engineering Co., Chicago, Ill.
Flo-Gage—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Flo-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Flo-Master—Valves. W-H Engineering Co., Chicago, Ill.
Flo-scope—Meters. Selas Corp. of America, Philadelphia, Pa.
Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Flo-watch—Flow meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Flowrator—Meters. Fischer & Porter Co., Hatboro, Pa.
Flualyzer—Analyzers. Engelhard, Inc., Chas., Newark, N. J.
Flush-Kleen—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Flux-Stik—Solder and fluxes. Lake Chemical Co., Chicago, Ill.
Foambuster—Compounds. Cannon Chemical Co., Inc., Everett, Mass.
Foamglas—Insulation. Armstrong Cork Co., Lancaster, Pa.
Foamglas—Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa.
Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Force-Flo—Circulators, fittings, heaters, regulators, systems, tanks. Kehm Corp., The, Chicago, Ill.
Fordair—Compressors. Schramm, Inc., West Chester, Pa.
Formet—Water treatment. Perolin Co., Inc., Chicago, Ill.
4-Point—Control systems. Perfex Corp., Milwaukee, Wis.
"400" Series—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.
Fracto-Crete—Refractories. Ramtite Co., The, Chicago, Ill
Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J.
Franzite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Free-Aire—Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.
Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.
Fre-Flo—Strainers. Fisher Governor, Marshalltown, Ia.
Freon—Refrigerant. Kinetic Chemicals, Inc., Wilmington, Del.
Fresh Air Maker—Propeller fans, units, ventilators. Schwitzer-Cummins Co., Indianapolis, Ind.
Frevent—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Frictionized—Belting. Baldwin Belting, Inc., New York, N. Y
Frigid—High pressure blowers, propeller fan blades and fans, paint spray booths, air conditioning units, ventilators. Circulators & Devices Mfg. Corp., New York, N. Y.
Frigistat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Frigitower—Cooling towers. Thermal Industries, Indio, Calif.
Frostaire—Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz
Fuel Saver—Boilers. International Boiler Works Co., East Stroudsburg, Pa.
Fuelsaver—Boilers. Columbia Radiator Co., McKeesport, Pa.
Fueltone—Fuel oil treatment. Ampion Corp., Long Island City, N. Y.
Fulflo—Filters. Commercial Filters Corp., Boston, Mass.
Fulljet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Fulscope—Recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N. Y.
Fuseair—Air diffusers. Aladdin Heating Corp., Oakland, Calif.
Fusomatic—Links. Preferred Utilities Mfg. Corp., New York, N. Y.
Fybr-Tech—Gaskets and sheets. Technical Ply-Woods, Chicago, Ill.
Fyr-Feeder—Spreader stokers. American Coal Burner Co., Chicago, Ill.
Fyrite—Analyzers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Fyritec—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.

GB—Fans. General Blower Co., Morton Grove, Ill.
G. B. C.—Fans, gages, regulators. General Blower Co., Inc., Philadelphia, Pa.
G-E—Compressors, condensers, thermostats. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
G-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.
GIL—Filters, regulators. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL Governoret—Valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL No-Hum—Check valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
G-R—Aftercoolers, oil coolers, water chillers, regulators. Griscom-Russell Co., The, New York, N. Y.
G-R—Unit coolers and air conditioners. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Gaco-Innerseal—Couplings. Gates Engineering Co., Wilmington, Del.
Gaco-Neoprene—Blades, coatings, fittings, hose, housings, pipe, valves Gates Engineering Co., Wilmington, Del.
Galongage—Gages. Applied Mechanics Co., Boston, Mass.
Galv-O-Zinc—Coatings. Blue Ridge Talc Co., Inc., Henry, Va.
Gasgun—Torches Century Aircraft, Inglewood, Calif.
Gast—Filters, separators. Johnson Corp., The, Three Rivers, Mich.
Gasteam—Radiators. Clow & Sons, James B., Chicago, Ill.
Gasweld—Torches, welding rod and apparatus. Liquid Carbonic Corp., The, Chicago, Ill.
Gasweld—Welding and cutting apparatus. Ergolyte Mfg. Co., Philadelphia, Pa.
Geddes—Radiation. Fowler & Wolfe Radiator Co., Norristown, Pa.
Gemaco—Compressors. General Machinery Co., Spokane, Wash.
Gemco—Bolts, clamps, hangers and supports, insulation. Goodloe E. Moore Co., Danville, Ill.
Gemco—Air conditioning units. General Engineering & Mfg. Co., St. Louis, Mo.
Gemware—Hygrometers, psychrometers, thermometers, G. M. Mfg. Co., New York, N. Y.
Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.
Gerotor—Rotary pumps. May Oil Burner Corp., Baltimore, Md.
Giant—Radiation. John J. Nesbitt, Inc., Philadelphia, Pa.
Giant—Radiator hangers. Western Hanger Co., San Francisco, Calif.
Gilbarco—Compressors, oil burners, heaters. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilsonite—Protective coatings. Ohmlac Paint & Refining Co., Chicago, Ill.
Gilt Edge—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Gland-Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Glasfab—Insulation wrapping. Lexington Supply Co., The, Cleveland, O.
Glazola—Caulking compounds. Nebel Mfg. Co., Cleveland, O.
Globak—Pipe flanges. Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Glo-Tech—Glass pipe. Fischer & Porter Co., Hatboro, Pa.

Glowan—Gas burners. Martin Co., Inc., J. O., San Francisco, Calif.
Gloweld—Welded steel tubing. Globe Steel Tubes Co., Milwaukee, Wis.
Glucosates—Compounds, steam system treatment. Haering & Co., Inc., D. W., Chicago, Ill.
Goetzerit—Gaskets. Johns-Manville, New York, N. Y.
Gohi—Sheets. Newport Rolling Mill Co., Newport, Ky.
Gold Bond—Insulation. National Gypsum Co., Buffalo, N. Y.
Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.
Grad-U-Motor—Damper operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Gradustat—Regulators, thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Gradutrol — Diaphragm valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Graylite—Insulation. Insulite Co., Minneapolis, Minn.
Greastop—Air filters. Air-Maze Corp., Cleveland, O.
Grid—Cooling and heating surface condensers, radiation, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.
Gripzins—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.
Gruvagrip—Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Guardian—Gaskets. Garlock Packing Co., Palmyra, N. Y.
Gunchrome—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Gunmix—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
GunPakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Guthfan—Fans. Guth Co., Edwin F., St. Louis, Mo.
Gyrol Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

H-B—Heaters. Handley Brown Heater Co., Jackson, Mich.
H & C—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
H-O-H—Compounds, feeders, steam system and water treatment. Haering & Co., Inc., D. W., Chicago, Ill.
HS—Fans. American Blower Corp., Detroit, Mich.
H-T—Smoke alarms. Autempco Corp., New York, N. Y.
Hairbestos—Insulation. Wilson & Co., Inc., Chicago, Ill.
Haircraft—Insulation. Wilson & Co., Inc., Chicago, Ill.
Hammerkraft—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.
Hammer-Set—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Hancock—Valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.
Handy—Ducts and duct fittings. Meyer & Bro. Co., F., Peoria, Ill.
Handy Andy—Vise stands. Western Wire Products Co., St. Louis, Mo.
Hardweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Hartman—Air conditioning units. Norwood Filtration Co., The, Florence, Mass.
Hartmann—Heaters. Montgomery Bros., San Francisco, Calif.
Hazleton—Pumps, strainers, valves. Barrett, Haentjens & Co., Hazleton, Pa.
Heacon—Dampers. Thermix Corp., The, Greenwich, Conn.
Health-Air—Ventilator and filter units. Reliable Sheet Metal Engineering Co., Chicago, Ill.
Health-Aire—Fans, heaters, housings, unit coolers, ventilators, washers. Johnson Fan & Blower Co., Chicago, Ill.
Health-Crete—Refractories. Quigley Co., Inc., New York, N. Y.
Heart-Oak—Belting. Graton & Knight Co., Worcester, Mass.
Heat-aid—Refractories. Pyrolite Products Co., Uniontown, Pa.
Heat Extractor—Boilers. National Radiator Co., The, Johnstown, Pa.
Heatomat—Boilers. Richmond Radiator Co., New York, N. Y.
Heat-O-Meter—Temperature regulators, thermostats. Miller-Harris Instrument Co., Milwaukee, Wis.
Heat-Pak—Boilers, heaters. Aldrich Co., The, Wyoming, Ill.
Heat-Rite—Registers. Auer Register Co., Cleveland, O.
Heatsum—Conductors. Roberson Co., L. N., Seattle, Wash.
Heat-Tite—Insulating cement. Ramtite Co., The, Chicago, Ill.
Heat-Valve—Ventilators. Swartwout Co., Cleveland, O.
Heat-X—Heat exchangers, water coolers. Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Helical—Tubing. Rome-Turney Radiator Co., Rome, N. Y.
Heliflow—Aftercoolers, chillers, oil coolers, heat exchangers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Hellite — Refractories. Johns-Manville, New York, N. Y.
Herco—Arc welders. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Herculoy—Tubing. Revere Copper and Brass, Inc., New York, N. Y.
Herecrol—Protective Coatings. Heresite & Chemical Co., Manitowoc, Wis.
Hevikoat—Electrodes. Universal Power Corp., Cleveland, Ohio.
Hi-Eff—Fan blades. Torrington Mfg. Co., Torrington, Conn.
Highflex—Belting. Goodrich Co., B. F., Akron, O.
High-Ten-500—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Hi-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Hilger—Chillers, refrigerating compressors, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Inc., Chicago, Ill.
Hi-Lift—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hi-Lo—Alarms. Yarnall-Waring Co., Philadelphia, Pa.
Hi-Lo—Pumps. Yeomans Bros. Co., Chicago, Ill.
Hi-Lo-Graph—Recorders. Yarnall-Waring Co., Philadelphia, Pa.
Hirae—Electric heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Hi-Seal—Cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Hi-Speed—Welding and cutting apparatus. Dockson Corp., Detroit, Mich.
Hi-Spra—Spray nozzles. Thermal Industries, Indio, Calif.
Hitchings—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Hi-Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Hi-Test—Boilers. Kewanee Boiler Co., Kewanee, Ill.
Hoffman—Water heaters. Clayton & Lambert Mfg. Co., Louisville, Ky.
Holdtite—Solder. American Brass Co., Waterbury, Conn.
Holgun—Drills. Black & Decker Mfg. Co., Towson, Md.
Holgun—Drills. Van Dorn Electric Tool Co., Towson, Md.
Hollo-Tech—Doors and panels. Technical Ply-Woods, Chicago, Ill.
Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Holtite—Clamps. Yarnall-Waring Co., Philadelphia, Pa
Honeycomb—Filters. Wilson & Co., Inc., Chicago, Ill.
Horneblende—Calking compounds. North American Fibre Products Co., The, Cleveland, O.
Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.
Hot Shot—Pumps. Yeomans Bros. Co., Chicago, Ill.
Hot Spot—Preheaters. Rempe Co., Chicago, Ill.
Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.
Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Huber—Stokers. Flynn & Emrich Co., Baltimore, Md.
Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.
Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.
Humidigraph—Humidity recorders. Bristol Co., Waterbury, Conn.
Humidiguide—Hygrometers. Taylor Instrument Companies, Rochester, N. Y.
Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.
Humiduct—Humidifiers, unit air conditioners. Bahnson Co., Winston-Salem, N. C.
Humid-U-Stat—Humidistats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Humi-Temps—Unit air coolers. Larkin Coils, Atlanta, Ga.
Humphrey—Unit heaters. General Gas Light Co., Kalamazoo, Mich.
Hurricane—Heaters. Zink Co., John, Tulsa, Okla.
Hurrivent—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Hycarb—Electrodes. Universal Power Corp., Cleveland, O.
Hydralt—Protective coatings. Flintkote Co., The, New York, N. Y.
Hydramotor—Valves. General Controls Co., Glendale, Calif.
Hydro—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Hydro-Clone—Dust collectors, welding fume exhausters. Whiting Corp., Harvey, Ill.
Hydro-Flo—Heating systems, circulators, regulators. Bell & Gossett Co., Morton Grove, Ill.
Hydro-Foil—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hydro-Matic—Connectors. Mechanical Products Corp., Chicago, Ill.
Hydron—Bellows, traps. Clifford Mfg. Co., Boston, Mass.
Hydro Therm—Heaters, heating systems. Hook & Ackerman, Inc., New York, N. Y.
Hydro-Whirl—Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.
Hydryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Hy-Duty—Blower wheels, fans. Schwitzer-Cummins Co., Indianapolis, Ind.
Hy-Power—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Hyrate—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Hy-Speed—Pipe vises. Munton Mfg. Co., Franklin Park, Ill.
Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.
Hytempite—Cement, refractories. Quigley Co., Inc., New York, N. Y.
Hy-Test—Water heaters, Smith Co, Inc., H. B., The, Westfield, Mass.

IMO—Pumps. De Laval Steam Turbine Co., Trenton, N. J.
I-R—Ingersoll-Rand, New York, N. Y.
IVCO—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
Ice-O-Matic—Refrigerating compressors. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.
Ideal—Blowers. Perfection Grate & Stoker Co., Springfield, Mass.
Ideal—Speed changers, pulleys and sheaves. Lovejoy Flexible Coupling Co., Chicago, Ill.
Ideal—Torches. Ideal Industries, Inc., Sycamore, Ill.
Ideal—Traps. Nason Co., Detroit, Mich.
Immersatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Impact—Spray nozzles. Cooling Tower Co., Inc., The, Div. of the Fluor Corp., Ltd., New York, N. Y.
Impulse—Traps. Yarnall-Waring Co., Philadelphia, Pa.
Inco—Electrodes, pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Tubing. Trent Tube Mfg. Co., East Troy, Wis.
Indeeco—Heaters. Industrial Engineering & Equipment Co., St. Louis, Mo.
IngAclad—Stainless clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
In-Hib-Co—Protective coatings. Haering & Co., Inc., D. W., Chicago, Ill.
Inkstop—Air filters. Air-Maze Corp., Cleveland, O.
Insidline—Pipe. Baldwin-Hill Co., Trenton, N. J.
Ins-lite—Insulation. Insulite Co., Minneapolis, Minn.
Instant—Heaters, preheaters. Johnson Corp., The, Three Rivers, Mich.
Insulag—Insulation. Quigley Co., Inc., New York, N. Y.
Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.
Insulcrete — Insulating cement, refractories. Quigley Co., Inc., New York, N. Y.
Insulduct—Ducts and duct fittings. Smith-Raymond Co., Columbus, Ga.
Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.
Insulwool—Insulation. General Insulating Products Co., Brooklyn, N. Y.
Insutube—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.
Intensarc—Electrodes. National Carbon Co., New York, N. Y.
Inter-Matic—Time switches. International Register Co., Chicago, Ill.
Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.
Ionaire—Ionization apparatus. Electroaire Corp., Chicago, Ill.
Irenew—Valves. Powell Co., Wm., Cincinnati, O.
Iron Lung—Ventilators. Powermatic Ventilator Co., Cleveland, O.
Ironset—Furnace cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Ironweld—Compounds. Sight Feed Generator Co., Richmond, Ind.
Irv-o-lite—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Isomodes—Bases and pads, vibration isolating. M. B. Mfg Co., The, New Haven, Conn.

J. B.—Pumps, Pacific Pump Works, Huntington Park, Calif.
J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.
J F S—Speed changers. Stephens-Adamson Mfg. Co., Aurora, Ill.
J & H—Bearings, compressors, motors. Jack & Heintz Precision Industries, Inc., Cleveland, O.
J-M—Gaskets. Johns-Manville, New York, N. Y.

J-M Ball—Floats, traps. Cryer Trap & Valve Co., Inc., New York, N. Y.
Jackhamer—Drills. Ingersoll-Rand Co., New York, N. Y.
Jacobus—Valves. Majot Automatic Machine Co., Inc., East Orange, N. J.
Janitrol—Boilers, burners, heaters, systems, unit air conditioners. Surface Combustion Corp., Toledo, O.
Jarco—Unions, valves. Jarecki Mfg. Co., Erie, Pa.
Jay Gee Silica Gel—Dehydrators. Joliet Chemicals, Inc., Joliet, Ill.
Ject-O-Valve — Ventilators. Swartwout Co., Cleveland, O.
Jennings—Pumps, ejectors. Nash Engineering Co., South Norwalk, Conn.
Jetal—Protective coatings. Alrose Chemical Co., Providence, R. I.
Jetcote—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.
Jiffy "Dial"—Regulators. Parker-Kalon Corp., New York, N. Y.
John Crane—Cement and compounds, seals. Crane Packing Co., Chicago, Ill.
Jointite—Insulation. Mundet Cork Corp., North Bergen, N. J.
Jones—Stokers. Riley Stoker Corp., Worcester, Mass.
Junior—Radiation. Weil-McLain Co., Michigan City, Ind.
JusRite—Ducts and duct fittings. Corbman Bros., Inc., Philadelphia, Pa.

K—Fittings. Kuhns Brothers Co., Dayton, O.
K. A. T.—Compounds and water treatment. American K.A.T. Corp., New York, N. Y.
K-B—Dampers, regulators. Kerentoff, G. L., Cincinnati, O.
K-C—Motors. Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
K-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.
K and M—Alarms, controls, strainers, traps, valves. Kieley & Mueller, Inc., North Bergen, N. J.
K-Master—Filters, strainers, traps, valves. Kaye & MacDonald, Inc., West Orange, N. J.
K-S-V—Ventilators. Kernchen Co., Chicago, Ill.
Kable Kord—Belting. Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Kaiser—Aluminum sheets. Permanente Products Co., Oakland, Calif.
Kane—Boilers. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Karbate—Carbon pipe, heat exchangers, pumps. National Carbon Co., New York, N. Y.
Kasson—Motors. General Die and Stamping Co., New York, N. Y.
Kathabar—Dehumidifiers, humidifiers, unit air conditioners. Surface Combustion Corp., Toledo, O.
Kaukit—Caulking compounds. Sonneborn Sons, Inc., L., New York, N. Y.
Kek—Compounds, steam and water treatments. Kenite Laboratory, Inc., New York, N. Y.
Kemtex—Water softener. MacDermid Chemical Co., Bristol, Conn.
Kenbric—Soot destroyers. Kenite Laboratory, Inc., New York, N. Y.
Kentucky—Sheets. Newport Rolling Mill Co., Newport, Ky.
Keystone—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Key-Tite—Cement and compounds. Key Co., East St. Louis, Ill.
Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.
Kimsul — Insulation. Kimberly-Clark Corp., Neenah, Wis.
King-clip—Valves. Lunkenheimer Co., Cincinnati, O.
King Pemco—Gages. Petroleum Equipment Mfg. Co., New Haven, Conn.
Kleen Air—Air filters. Kaye & MacDonald, Inc., West Orange, N. J.
Kleenflo—Unit air filters. Air-Maze Corp., Cleveland, O.
Kleen Tube—Heaters. Vapor Car Heating Co., Inc., Chicago, Ill.
Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.
Klixon—Temperature controls, valves. Spencer Thermostat Co., Attleboro, Mass.
Klondike—Arc welders. Fern, Ralph, Scranton, Pa.
Klosd—Motors. Sterling Electric Motors, Inc., Los Angeles, Calif.
Knight-Ware—Pipe, prefabricated ducts, valves, ventilators. Knight, Maurice A., Akron, O.
Knock-Out—Arc welders, torches, drills. Lee Co., K. O., Aberdeen, S. D.
Kno-Draft—Air diffusers. Connor Engineering Corp., W. B., New York, N. Y.
Kold Board—Insulation. Baldwin-Hill Co., Trenton, N. J.
Kontrol Master—Air valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kontrol Motor—Diaphragm valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kooler-Aire — Commercial air conditioners. United States Air Conditioning Corp., Minneapolis, Minn.
Kool-Shade—Solar heat resisting screens. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Korector—Draft controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Korolac—Protective coatings. Goodrich Co., B. F., Akron, O.
Koroseal—Plastic tubing, protective coatings. Goodrich Co., B. F., Akron, O.
Koven—Heaters. Waterfilm Boilers, Inc., Jersey City, N. J.
Krakstik—Compounds. Lake Chemical Co., Chicago, Ill.
Kres Kno—Boilers. Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Kristokrak—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Kromatrol—Colorimeters. Will Corp., Rochester, N. Y.
Krome Kote—Coatings. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Kwikflux—Solder. Special Chemicals Corp., New York, N. Y.
Kwik-way—Regulators. Hart & Cooley Mfg. Co., Holland, Mich.

L. A.—Motors. The Louis Allis Co., Milwaukee, Wis.
L M—Tubing. Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
L&N—Regulators. Leeds & Northrup Co., Philadelphia, Pa.
L-R—Couplings. Lovejoy Flexible Couplings Co., Chicago, Ill.
L. R. D.—Valves. Grinnell Co., Inc., Providence, R. I.
Lamneck—Ducts and duct fittings. Clayton & Lambert Mfg. Co., Middletown, O.
Lawson—Wrenches. USHCO Mfg. Co., Inc., Buffalo, N. Y.
L-Blow—Fans, ventilators. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Lead-Sealed—Lead sheets. Continental Steel Corp., Kokomo, Ind.
Leaflex—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Leak-Pruf—Gages. Petroleum Equipment Mfg. Co., New Haven, Conn.
Lectro-Clad—Protective coatings. Bart Mfg. Co., Inc., Belleville, N. J.
Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Ledaloyl—Sleeve bearings. Johnson Bronze Co., New Castle, Pa.
Leeds—Switches. Walton Co., Hartford, Conn.
Lektro-Kleen—Air cleaners. Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y. & Columbus, O.
Letheray—Sterilizing lamps. Hanovia Chemical & Mfg. Co., Newark, N. J.
Levalarm—Alarms. Reliance Gauge Column Co., Cleveland, O.
Levelometer—Gages, recorders. Liquidometer Corp., Long Island City, N. Y.
Level-Temp—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.
Level-Trol—Regulators. Fisher Governor Co., Marshalltown, Ia.
Lexsuco—Insulation Fasteners. Lexington Supply Co., Cleveland, O.
Liberty—Packing. Johns-Manville, New York, N. Y.
Liberty—Ventilators, caps. Penn Ventilating Co., Philadelphia, Pa.
Light Duty—Pulleys. Gates Rubber Co., The, Denver, Colo.
Lightening Hole—Punches. C-B Tool Co., Lancaster, Pa.
Lightning — Cleaning compounds. Western Chemical Co., Kansas City, Mo.
Lightweight Champ—Pipe benders. Electric Cord Co., New York, N. Y.
Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Lima—Stokers. Carnes, Inc., John R., Lima, O.
Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.
Limitorque—Valves. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Limpet—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Linewelder—Welders. Lincoln Electric Co., The, Cleveland, O.
Lineflow—Fans. American Blower Corp., Detroit, Mich.
Line-o-flo—Air diffusers, grilles. Barber-Colman Co., Rockford, Ill.
Lin-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Linco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.
Lipman—Compressors, cooling surface, water chillers. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Liquid-Fin — Heat exchangers. Remco, Inc., Zelienople, Pa.
Liquivator—Steam traps. Morehead Mfg. Co., Detroit, Mich.
Liquon—Filters, water softeners, water treatment, deaerators. Liquid Conditioning Corp., Linden, N. J.
Lithcote—Coatings. Lithgow Corp., Chicago, Ill.
Little Blacksmith—Punches, shears. Kidder Mfg. Co., Inc., J. F. Burlington, Vt.
Little Giant—Sump pumps. Chicago Pump Co., Chicago, Ill.
Little Giant—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Little Giant—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Livermont—Wrenches. Richmont, Inc., Los Angeles, Calif.
Lloyd—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Lo-Blast—Burners. Mid-Continent Metal Products Co., Chicago, Ill.
Locarb—Electrodes. Universal Power Corp., Cleveland, O.
Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Lockseam—Pipe. Naylor Pipe Co., Chicago, Ill.
Locktite—Regulators, dampers. Ohio Products Co., Cleveland, O.
Lodi—Boilers. Super Mold Corp., Lodi, Calif.
Lok-Joint—Insulation. Insulite Co., Minneapolis, Minn.
Lolag—Heaters. American Instrument Co., Silver Spring, Md.
Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.
Lookout Heggie-Simplex—Boilers. Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Lord Burnham—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Lo-Set—Stokers. Canton Stoker Corp., Canton, O.
Lowcost—Boilers. Murray Iron Works Co., Burlington, Ia.
Loxin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Luminarc—Electrodes. Universal Power Corp., Cleveland, O.
Lyonore Metal—Sheets. Lyon, Conklin & Co., Inc., Baltimore, Md.

M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
M. & E.—Cooling surface, tubing, unit coolers, unit heaters. Merchant & Evans Co., Philadelphia, Pa.
M & F—Rubber base enamel. American-Marietta Co., Chicago, Ill.
M & H—Sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
MIF—Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.
MKO—Pumps. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
M & M—Alarms, cut-offs, feeders, humidifiers, indicators, operators, pumps, regulators, switches, valves. McDonnell & Miller, Inc., Chicago, Ill.
M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.
M & S—Gaskets. Mitchell & Smith, Inc., Detroit, Mich.
M-Scope—Pipe locators. Fisher Research Laboratory, Inc., Palo Alto, Calif.
M & T—Welders. Metal & Thermit Corp., New York, N. Y.
MTB—Oil burners. John Zink Co., Tulsa, Okla.
M/W and A/C Airmat—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.
Magic—Cement and compounds. Blue Ridge Talc Co., Inc., Henry, Va.
Magic Eye Door—Door controls. Stanley Works, The, New Britain, Conn.
Magic-Grip—Sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Magnefer—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Magnetrol—Alarms, boiler cut-offs, switches. Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Make-up Air—Air conditioning units. New York Blower Co., Chicago, Ill.
Manganend—Electrodes. Arcos Corp., Philadelphia, Pa.
Manganweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Mangenarc—Electrodes. Universal Power Corp., Cleveland, O.
Manotox—Coatings. X-Pando Corp., Long Island City, N. Y.
Manu-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Mark Time—Time switches, time delay relays. Rhodes, Inc., M. H., Hartford, Conn.
Marocol—Compounds. O'Brien Industries, Jersey City, N. J.
Marsalis—Dust collectors, fans, pumps, ventilators, air conditioning units. American Metal Products Co., Fort Worth, Tex.
Martell—Packing. France Packing Co., Tacony, Philadelphia, Pa.
Marvair—Air conditioning units. Muncie Gear Works, Muncie, Ind.
Marvelous—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Marvelwite—Enamels and lacquers. Sonneborn Sons, Inc., L., New York, N. Y.
Masco—Combustion chambers. Munn & Steele, Inc., Newark, N. J.
Mascocement—Refractories. Munn & Steele, Inc., Newark, N. J.
Mascokast—Refractories. Munn & Steele, Inc., Newark, N. J.
Mascolite—Pipe insulation. Munn & Steele, Inc., Newark, N. J.
Mascote—Insulation. Munn & Steele, Inc., Newark, N. J.
Massachusetts—Fans, unit heaters, blower wheels, air washers, housings. Bishop & Babcock Mfg. Co., Cleveland, O.
Master—Stokers. Muncie Gear Wks., Inc., Muncie, Ind.

Master—Speed changers, controls, thermostats, regulators, switches. White Mfg. Co., St. Paul, Minn.
Master—Unions. Jefferson Union Co., Inc., New York, N. Y.
Master—Water heaters. Kehm Corp., The, Chicago, Ill.
Master Kraft—Oil burners. Harvey-Whipple, Inc., Springfield, Mass.
Master Pilot—Valves. Powell Co., Wm., Cincinnati, O.
Maximon—Gages. J. E. Lonergan Co., Philadelphia, Pa.
McDaniel—Floats, traps. Watson & McDaniel Co., Philadelphia, Pa.
McKee—Blowers, boilers, burners, feeders, pumps, regulators, tanks, torches, valves. Eclipse Fuel Engineering Co., Rockford, Ill.
McKeesport—Radiation. Columbia Radiator Co., McKeesport, Pa.
McKnight—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Measurrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Meco—Torches, welding rod. Modern Engineering Co., St. Louis, Mo.
Medrae—Electric heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Melloblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Mel-Rock—Humidifiers, units, ventilators, washers. Mellish & Murray Co., Chicago, Ill.
Merrill Process—Heating systems. Parks-Cramer Co., Fitchburg, Mass.
Metal-Master—Shears. Wiss & Sons Co., J., Newark, N. J.
Metalite—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Metalprep—Compounds. Nielson Chemical Co., Detroit, Mich.
Metco—Ducts and duct fittings. Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Metermax—Combustion control systems. Leeds & Northrup Co., Philadelphia, Pa.
Metl-Tech—Doors and panels, metal sheets. Technical Ply-Woods, Chicago, Ill.
Metric—Meters. American Meter Co. Inc., New York, N. Y.
Metrotherm—Thermostats. General Controls Co., Glendale, Calif.
Micafil—Insulation. Munn and Steele, Inc., Newark, N. J.
Mico—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.
Micro—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Micro-Feed—Humidifiers. Cleveland Humidifier Co., Cleveland, O.
Micro-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.
Micromax—Hygrometers, recorders, recorder-controllers. smoke alarms, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Micromet—Water treatment. Calgon Inc., Pittsburg, Pa.
Micro-Netic—Feeders. Campbell Co., J. A., Long Beach, Calif.
MicroRold — Sheets. Washington Steel Corp., Washington. Pa.
Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.
Microvac—Pumps. Stokes Machine Co., F. J., Philadelphia, Pa.
Microwax—Smoke alarms. Leeds & Northrup Co., Philadelphia, Pa.
Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.
Midget—Radiation. Utica Radiator Corp., Utica, N. Y.
Midget Powerhouse—Unit heaters. Century Engineering Corp., Cedar Rapids, Ia.
Mighty Midget—Portable shears. Stanley Works, The, New Britain Conn.
Mighty Mite—Thermostats. Mechanical Industries Production Co., Akron, O.
Milcor—Doors and panels. Inland Steel Products Co., Milwaukee, Wis.
Milford—Tools, Thompson & Son Co., The Henry G., New Haven, Conn.
Mills—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.
Milvaco—Air eliminators, floats, strainers, traps, valves, Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis—Compressors. North Penn Co., New York, N. Y.
Miracle Air—Window ventilator units. Reliable Sheet Metal Engineering Co., Chicago, Ill.
Miracle Red—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Miracula—Air conditioning units. General Engineering & Mfg. Co., St. Louis, Mo.
Mir-O-Meter—Combustion control systems. Bowser, Inc., Fort Wayne, Ind.
Mirro-Matic—Heaters. Handley Brown Heater Co., Jackson, Mich.
Mirro-Shell—Heaters. Handley Brown Heater Co., Jackson, Mich.
MKayO—Boilers. Mears-Kane-Ofeldt Inc., Philadelphia, Pa.
Model Star—Valves. Powell Co., Wm., Cincinnati, O.
Moderator—Heating System. Warren Webster Co., Camden, N. J.
ModernAire—Fans, unit air conditioners. National Gas Equipment Co., Inc., Terrell, Tex.
Moduflow—Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modustat—Valves, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutrol—Heating systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutron—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mogul—Packing. Johns-Manville, New York, N. Y.
Mogul—Boiler cleaning compounds and water treatment. North American Fibre Products Co., The, Cleveland, O.
Moisturator—Humidifiers. Bridgeport Brass Co., Bridgeport, Conn.
Moncrief—Sheet metal pipe and fittings. Henry Furnace Co., The, Medina, O.
Monel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York N. Y.
Monend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Mongol—Pipe joint cement and compounds. Baer Bros., New York, N. Y.
Monmouth—Filters, humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Mono-Block—Insulation. Baldwill-Hill Co., Trenton, N. J.
Monobolt—Chillers, oil coolers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.
Monoflo—Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.
Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.
Monoloct—Heat exchangers. Graham Mfg. Co., Inc., New York, N. Y.
Mono-Peen—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Monovent—Ventilators. Burt Mfg. Co., Akron, O.
Monsoon—Fans, grilles, louvers. Jamieson Mfg. Co., Dallas, Texas.
Morflex—Flexible couplings. Morse Chain Co., Detroit, Mich.
Morpholine—Steam system treatment. Carbide & Carbon Chemicals Corp., New York, N. Y.
Mortairset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mortex—Protective coatings. Mortell Co., J. W., Kankakee, Ill.
Mortite—Gaskets. Mortell Co., J. W., Kankakee, Ill.
Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Motopump—Pumps. Yeomans Bros. Co., Chicago, Ill.
MotoReducer—Speed reducers. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Motorstoker—Stokers. Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.
Mototurb—Ventilators. Uno Ventilator Co., Cliftondale, Mass.
Mountain Air—Air conditioning units. Central States Mfg. Co., Inc., Arkansas City, Kan.
Mountain Stream—Water coolers. Refrigeration Engineering Corp., Philadelphia, Pa.
Muffletone—Insulation. Celotex Corp., The, Chicago, Ill.
Mullitex—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mult-Au-Matic—Threading and boring machines. Bullard Co., The, Bridgeport, Conn.
Multiblade—Welding fume exhausters. General Blower Co., Chicago, Ill.
Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multiduty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Multifin—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Multiplane—Vibration isolating bases. Lord Mfg. Co., Erie, Pa.
Multiport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Multiseal—Gaskets. Johns-Manville, New York, N. Y.
Multi-Seal—Bolts, repair plugs. Rolyan Metal Products, Chicago, Ill.
Multitherm—Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.
Multi-V—V-belts. Goodrich Co., B. F., Akron, O.
Multivane—Fans, blowers, unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Multi-V-Drive—Drives. Worthington Pump & Machinery Corp., Harrison, N. J.
Multi-Vent—Ceiling panels. Pyle-National Co., The, Chicago, Ill.
Multi-Wash—Dust collectors. Schneible Co., Claude B., Detroit, Mich.
Murco—Aftercoolers, cooling towers, heat exchangers, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.
Murex—Welding electrodes. Metal & Thermit Corp., New York, N. Y.
Murray—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

NCG—Solder, torches, welding rod. National Cylinder Gas Co., Chicago, Ill.
N-M-D—Valves. Lunkenheimer Co., Cincinnati, O.
N-R—Condensers, heat exchangers. National Radiator Co., The, Johnstown, Pa.
NYBCo Steelfin—Heating surface. New York Blower Co., Chicago, Ill.
Nalco—Feeders, water treatment, soot destroyers. National Aluminate Corp., Chicago, Ill.
National—Boilers, heaters. National Radiator Co., The, Johnstown, Pa.
National—Burners. Combustion Systems Div., Vapofier Corp., Chicago, Ill.
National—Fans, furnaces, heaters. MaGirl Foundry & Furnace Co., Bloomington, Ill.
National—Heaters. Mid-Continent Metal Products Co., Chicago, Ill.
National—Pumps. Austin-Mason Co., New York, N. Y.
National—Pipe, tubing. National Tube Co., United States Steel Corp., Subisdiary, Pittsburgh, Pa.
Natur Temp—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Naturzone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Navalon—Fiber packing. Johns-Manville, New York, N. Y.
Nelson—Stokers. Heating Assurance, Inc., Spokane, Wash.
Nemo—Insulating cement. Smith & Kanzler Corp., Elizabeth, N. J.
Newarc—Welding electrodes. Electric Arc, Inc., Newark, N. J.
New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
Niagara—Meters. Buffalo Meter Co., Buffalo, N. Y.
Nibco—Fittings, joints, valves. Northern Indiana Brass Co., Elkhart, Ind.
Nibcoloy—Fittings, pipe, stainless steel. Northern Indiana Brass Co., Elkhart, Ind.
Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nickend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nicuend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nite Cool—Fans. Air Equipment Co., Chicago, Ill.
No Drip—Insulation. J. W. Mortell Co., Kankakee, Ill.
Non-clog—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.
Non-Clogging—Spray nozzles. Link-Belt Co., Chicago, Ill.
Non-Con-Dux—Cement, insulation. Wilson, Inc., Grant, Chicago, Ill.
Non-Frost—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Non-Sweat—Insulation. Keasbey & Mattison Co., Ambler, Pa.
No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
Norblo—Dust collectors, fans. Northern Blower Co., Cleveland, O.
No-Rivet—Regulators, dampers. Ohio Products Co., Cleveland, O.
Northwestern—Water heaters. Coe Mfg. Co., Painesville, O.
Northwind—Unit air coolers. Pleasantaire Corp. of America, Washington, D. C.
Norwesco—Cement and compounds, boiler and radiator sealing compounds. Atlas Chemical Co., Marietta, O.
No Streak—Registers. Rock Island Register Co., Rock Island, Ill.
No-Thread—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
No-Vent—Pumps. Stout & Sons, David, St. Louis, Mo.
Novoid—Insulation, adhesives. Cork Import Corp., Suburban Englewood, N. J.
Nox-Odor—Odor adsorber. Tamms Silica Co., Chicago, Ill.
Nu-Air—Fans, window ventilator units. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Nu-Alpina—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Nu-Grip—Shears and snips. Wiss and Sons Co., J., Newark, N. J.
Nu-Notch—Mushroom ventilators. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Nuvent—Ventilators. Aeolus Dickinson, Chicago, Ill.
Nu-Wood—Insulation. Wood Conversion Co., St. Paul, Minn.

OB—Valves, Ohio Brass Co., Mansfield, O.
O'B-Aid—Compounds. O'Brien Industries, Jersey City, N. J.
O'B-Col—Compounds. O'Brien Industries, Jersey City, N. J.
O'B Gae—Water treatment. O'Brien Industries, Jersey City, N. J.
O'B-Ox—Water treatment. O'Brien Industries, Jersey City, N. J.
OCH—Filters. American Air Filter Co., Louisville, Ky.
O.E.M.—Cement and compounds. Oil Equipment Mfg. Corp., New Haven, Conn.
OK—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
OK—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Oakwood—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
O'Burnit—Soot destroyers. O'Brien Industries, Jersey City, N. J.
Octopus—Welding fume exhausters. Chelsea Fan & Blower Co., Inc., Irvington, N. J.

Ofeldt—Boilers. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Inc., Everett, Mass.
Oil-O-Matic—Oil burners. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington Ill.
Oilway—Oil fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Ol' Faithful—Humidifiers. Maid-'O-Mist, Inc., Chicago, Ill.
One Venturi—Heating systems. Taco Heaters, Inc., Providence, R. I.
Oriflex—Valves. Dunham Co., C. A., Chicago, Ill.
Oswego—Cutters, punches, wrenches. International Nutyp Tool Co., Oswego, N. Y.
Ovaltube—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oxweld—Compounds, welding rod, welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Oxycuttend—Electrodes. Arcos Corp., Philadelphia, Pa.
Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.

P. B. H.—Cocks, try cocks. Paul B. Huyette Co., Inc., Philadelphia, Pa.
PC—Air conditioning units. Buffalo Forge Co., Buffalo, N. Y.
P-D—Pumps. Peters-Dalton, Inc., Detroit, Mich.
PD QC—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
P & H—Blue print machines. Peck & Harvey, Chicago, Ill.
P & H—Welding electrodes, arc welders. Harnischfeger Corp., Milwaukee, Wis.
P. I. V. Gear—Speed changers. Link-Belt Co., Philadelphia, Pa.
Paintgrip—Sheets. Armco Steel Corp., Middletown, O.
Paladin—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Palco—Packing. Greene, Tweed & Co., North Wales, Pa.
Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.
Palmaire—Furnaces, unit heaters, humidifiers. Palmer Mfg. Corp., Phoenix, Ariz.
Palmetto—Packing, cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Palmetto Superheat—Gaskets and packing. Greene, Tweed & Co., North Wales, Pa.
Pan-L-Grid—Coils and panels. Pan-L-Heat Corp., Portland, Ore.
Par—Condensing units. Lynch Mfg. Corp., Toledo, O.
Paracoil—Coils, condensers, heaters, oil coolers, pipe nipples, preheaters, steam traps, water chillers. Davis Engineering Corp., Elizabeth, N. J.
Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Parasol—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Parko—Psychrometers. Parks-Cramer Co., Fitchburg, Mass.
Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.
Pax-Tite—Leather packing. Watson-Stillman Co., Roselle, N. J.
Pedrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Peerless—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Peerless—Direct radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Pemco—Flue caps, nipples. Petroleum Equipment Mfg. Co., New Haven, Conn.
Penco—Plastic fittings, pipe. North Penn Co., New York, N. Y.
Penflex-Weld—Absorbers. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Penn-M-Co—Fittings. Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Penn-Power—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Penn-Turbine—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Perco-Flash—Water heaters. Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Perfection—Electrodes. Carlin Co., Anthony, Cleveland, O.
Perfection—Hangers and supports. Iwan Brothers, Inc., South Bend, Ind.
Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Perfection—Valves. American District Steam Co., North Tonawanda, N. Y.
Perfecto—Boiler parts. Green Fire Brick Co., Mexico, Mo.
PeroNite—Soot destroyers. Perolin Co., Inc., Chicago, Ill.
Petco—Insulating cement, chambers. Peterson Co., B. A., Dowagiac, Mich.
Petro—Oil burners, water heaters. Petroleum Heat & Power Co., Stamford, Conn.
Pexto—Brakes, punches, shears, wrenches, Peck, Stow & Wilcox Co., Southington, Conn.
Pilot—Valves. Powell Co., Wm., Cincinnati, O.
Pilotstat—Flame failure controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pioneer—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Pipe Master—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Pipemaster—Wrenches. Erie Tool Wks., Erie, Pa.
Pipetite—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Pitco—Unions. Pittsburgh Valve & Fittings Corp., Barberton, O.
Pittsburgh—Radiator, unit heaters. Automatic Gas Equipment Co., Pittsburgh, Pa.
Pittsburgh-National—Meters. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.
Plasti-Calk—Caulking compounds. Chamberlin Co. of America, Detroit, Mich.
Plastikon—Caulking compounds. Goodrich Co., B. F., Akron, O.
Plastite—Caulking compounds. U. S. Stoneware Co., New York, N. Y.
Plastoid—Caulking compounds, furnace cement. Plastic Products Co., Detroit, Mich.
Platecoil—Coils. Kold-Hold Manufacturing Co., Lansing, Mich.
Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Plexifin—Unit heaters. Bayley Blower Co., Milwaukee, Wis.
Plexiform—Fans. Bayley Blower Co., Milwaukee, Wis.
Plicast—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Plisulate—Insulating cement and insulation. Plibrico Jointless Firebrick Co., Chicago, Ill.
Plumrite—Pipe. Bridgeport Brass Co., Bridgeport, Conn.
Plymouth—Stokers. Clizbe Bros. Mfg. Co., Plymouth, Ind.
Ply-Tech—Plywood sheets and board. Technical Ply-Woods, Chicago, Ill.
Pneumatronic—Electronic and pneumatic temperature control equipment. Johnson Service Co., Milwaukee, Wis.
Poeco—Insulation. Poe Co., C. W., Cleveland, O.
Polartron—Relays, regulators, switches Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
Polymerin—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Polymeroid—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polytherm—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Poronze—Filters. Wabash Mfg. Co., Chicago, Ill.
Poro-Stone—Filters. Adams Co., Inc., R. P., Buffalo, N. Y.
Porto-Power—Pipe benders and pipe pushers. Blackhawk Mfg. Co., Milwaukee, Wis.
Porto-Shear—Shears. Van Dorn Electric Tool Co., Towson, Md.
Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.
Portovent—Hose. American Ventilating Hose Co., New York N. Y.
Poweraire—Furnaces. Jackson & Church Co., Saginaw, Mich.
Powerated—Furnaces. Jackson & Church Co., Saginaw, Mich.
Power—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Power Boy—Pipe cutting and threading machines. Oster Mfg. Co., Cleveland, O.
Powercord—Flat belt drives. Gates Rubber Co., The, Denver, Colo.
Powermaster—Boilers. Orr & Sembower, Inc., Reading, Pa.
Poweroil—Oil burners. Jackson & Church Co., Saginaw, Mich.
Precipitron—Air cleaners. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Precision—Nozzles. Benjamin Air Rifle Co., St. Louis, Mo.
Premier—Welding rod. American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
Pre-Notch—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Pressure-Link—Gages. J. E. Lonergan Co., Philadelphia, Pa.
Pressuretrol—Regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Prestico—Caulking compounds, furnace cement, Presstite Engineering Co., St. Louis, Mo.
Prest-O-Lite—Leak detectors, torches. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Presto-Lock—Couplings. Drinkwater, Inc., Waukegan, Ill.
Prest-O-Weld—Welding and cutting apparatus. Linde Air Products Co., The, New York, N. Y.
Princo—Anemometers, gages, hygrometers, manometers, psychrometers, regulators, relays, thermometers, thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.
Probestos—Gaskets. Johns-Manville, New York, N. Y.
Propeloflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Prop-R-Temp—Air conditioning units. Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Protectoglo—Controls. Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Protectomotor—Air filters. Dollinger Corp., Rochester, N. Y.
Protector—Lamps. C-B Tool Co., Lancaster, Pa.
Protect-O-Ray—Lamps. Lustra Corp. of America, New York, N. Y.
Protectorelay—Flame failure controls, relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Protectoring—Gaskets. Johns-Manville, New York, N. Y.
Protex—Water treatment. Apex Engineering Co., Chicago, Ill.
Proxlin—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Pryzoak—Belting. Graton & Knight Co., Worcester, Mass.
Pul-Air—Ventilators. Lyon, Conklin & Co., Inc., Baltimore, Md.
Pul Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.
Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.
Punkah—Louvers and shutters. Kelvin-White Co., Boston, Mass.
Pup—Valves. Fisher Governor Co., Marshalltown, Ia.
Puridryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Pur-O-Fiers—Separators. Goodyer Industries, Inc., Chicago, Ill.
Purox—Electrodes, welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Pyralux—Enamels and lacquers. du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept, Wilmington, Del.
Pyratherm—Controls. Mercoid Corp., The, Chicago, Ill.
Pyrex—Glass pipe, gage and sight glasses. Corning Glass Wks., Corning, N. Y.
Pyro—Thermometers, recorders, regulators. Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Pyrofax—Propane gas refrigerant. Carbide and Carbon Chemicals Corp., New York, N. Y.
Pyroflex—Coatings, lined pipes, tanks, enamels and lacquers. Knight, Maurice A., Akron, O.
Pyromaster—Regulators. Bristol Co., The, Waterbury, Conn.
Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.

QD—Sheaves. Worthington Pump & Machinery Corp., Harrison, N. J.
Q-T—Insulation. Celotex Corp., The, Chicago, Ill.
QT—Unit heaters. Kisco Boiler & Engineering Co., St. Louis, Mo.
Q-Chromastic—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Chrome—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Seal—Caulking compounds. Quigley Co., Inc., New York, N. Y.
Quad—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Quantrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Quick-as-Wink—Valves. C. B. Hunt & Son, Inc., Salem, O.
Quiet Zone—Blower wheels, fans. Palmer's Mfg. Corp., Phoenix, Ariz.

RB—Couplings. Link-Belt Co., Indianapolis, Ind.
RBC—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.
RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.
RC—Cement and compounds, compounds, destroyers, water treatment. Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
R. & G—Grilles. registers. Register & Grille Mfg. Co., Brooklyn, N. Y.
R. I. 250—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.
R-K—Combustion control systems, regulators, valves. Ruggles-Klingemann Mfg. Co., Salem, Mass.
R & M—Motors. Robbins & Myers, Inc., Springfield, O.
R-M—Packing. Raybestos-Manhattan, Inc., Passaic, N. J.
R & M Moyno—Pumps, Robbins & Myers, Inc., Springfield, O.
R.P.—Air filters, water softeners. Research Products Corp., Madison, Wis.
R. P. & C.—Fittings, valves. Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
RTC—Valves—Gold Top Heating, Inc., Butte, Mont.
R-U-F—Fans. Reed Unit-Fans, Inc., New Orleans, La.
RX—Coatings. Watson-Standard Co., Pittsburgh, Pa.
Race—Fans, heaters. Royal Heaters, Inc., Alhambra, Calif.
Radiafin—Finned tubing, finned surface. Schutte & Koerting Co., Philadelphia, Pa.
Radialflow—Valves. Smolensky Valve Co., Inc., Bedford, O.

Radiant—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Radiantrol—Valves. Homestead Valve Mfg. Co., Coraopolis Pa.
Radiatherm—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.
Radi-Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.
Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.
Rador—Temperature regulators. Vapor Heating Corp., Chicago, Ill.
Raintite—Ventilators. Aeolus Dickinson, Chicago, Ill.
Rajah—Packing. Johns-Manville, New York, N. Y.
Ramapo—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Ramset—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.
Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.
Rapiduction—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Ratosight—Alarms, flow switches. Fischer & Porter Co., Hatboro, Pa.
Rawl-Anchor—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawldrill—Drills for masonry. Rawlplug Co., Inc., The, New York, N. Y.
Rawl-Drive—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Raydiant—Radiation. Weil-McLain Co., Michigan City, Ind.
Rayduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Ready-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Reco—Accumulators, condensers, headers, heaters, preheaters, tanks, unit coolers. Richmond Engineering Co., Richmond, Va.
Reco—Controllers and starters, motors, propeller fans, switches. Reynolds Electric Co., Chicago, Ill.
Reco—Water chillers. Refrigeration Engineering Co., Philadelphia, Pa.
Recold—Refrigerating evaporative condensers, coolers, cooling & heating surface. Refrigeration Engineering, Inc., Los Angeles, Calif.
Reco-Radi-Aire—Fans. Reynolds Electric Co., Chicago, Ill.
Record-O-Stat—Recorder-controllers. Johnson Service Co., Milwaukee, Wis.
Recoy—Chillers, condensers, cooling surface, unit air conditioners and coolers. Refrigeration Economics Co., Inc., Canton, O.
Red—Compressors, controllers and starters, heaters, indicators, operators, regulators, switches, thermostats, valves. Cooper Co., Clark, Palmyra, N. J.
Red Cap—Ventilators. Warner Ventilating Co., La Grange, Ind.
Red Devil—Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.
Red Diamond—Pipe. American District Steam Co., North Tonawanda, N. Y.
Red-E-Haul—Portable machines. American Die & Tool Co., Inc., Reading, Pa.
Red Flash—Traps. Ellis Drier Co., Chicago, Ill.
Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.
Red Head—Traps. Ellis Drier Co., Chicago, Ill.
Redi—Stokers. General Machinery Co., Spokane, Wash.
Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Redi-Vac—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Red Reading Mercury—Hygrometers, psychrometers, thermometers. Palmer Thermometers, Inc., Cincinnati, O.
Red Seal—Engines. Continental Motors Corp., Muskegon, Mich.
Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.
Red Top—Humidistats, thermostats. H-B Instrument Co., Philadelphia, Pa.
Red Top—Valves. Neptune Meter Co., New York, N. Y.
Red Top—Insulation. United States Gypsum Co., Chicago, Ill.
Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.
Refrak Screen—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Rego—Welding and cutting apparatus. Universal Power Corp., Cleveland, O.
Rego—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Reliable—Preheaters. Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Reliance—Regulators. American Meter Co., Inc., New York, N. Y.
Remote—Indicators. Yarnall-Waring Co., Philadelphia, Pa.
Renewo—Valves. Lunkenheimer Co., Cincinnati, O.
Renu-Vent—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Research—Belting. Graton & Knight Co., Worcester, Mass.
Resiscote—Enamels and lacquers. Reilly Tar & Chemical Corp., Indianapolis, Ind.
Resistive—Insulation. Infra Insulation, Inc., New York, N. Y.
Revolute—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Revolving—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Revolving—Ventilators. Burt Mfg. Co., Akron, O.
Rex—Chain drives, coal and ash conveyors, couplings, nozzles, pillow blocks, pumps. Chain Belt Co., Milwaukee, Wis.
Rex—Fans, ventilators, wheels. Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Rexarc—Electrodes, welders. Sight Feed Generator Co., Richmond, Ind.
Rex-Flex—Ducts. Chicago Metal Hose Corp., Maywood, Ill.
Rex-Tube—Duct connections. Chicago Metal Hose Corp., Maywood, Ill.
Rexvane—Fans. Sturtevant Co., B.F., Div. of Westinghouse Electric, Boston, Mass.
Rex-Weld—Hose. Chicago Metal Hose Corp., Maywood, Ill.
Rhino—Caulking compounds. Pecora Paint Co., Philadelphia, Pa.
Richmond Heatomat—Heaters. Richmond Radiator Co., New York, N. Y.
Rid-Al—Cleaning compounds, water treatment. Apex Engineering Co., Chicago, Ill.
Ridgid—Pipe machines, wrenches, cutters, vises. Ridge Tool Co., Elyria, O.
Rid-Sludge — Cleaning compounds, corrosion treatment. Apex All Weather Products, Chicago, Ill.
Rifco 300—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.
Riflex—Vibration absorbers. United Metal Hose Co., Inc., Long Island City, N. Y.
Rihco—Humidifiers. Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Rincontrol—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Ripple-Fin—Cooling and heating surface. Mcquay, Inc., Minneapolis, Minn.
Robinson—Brakes, punches. New Albany Machine Mfg. Co., New Albany, Ind.
Robot-Eye—Regulators, smoke alarms, combustion control systems. General Power Plant Corp., New York, N. Y.
Rockwell—Blast gates. Thermix Corp., The, Greenwich, Conn.
Rocop—Heaters. Rome-Turney Radiator Co., Rome, N. Y.
Rodpax—Packing. National Engineering Products, Inc., Washington, D. C.
Ro-Flo—Compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Rolagrip—Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Roll-a-Bend—Pipe benders. Radiant Devices, St. Louis, Mo.
Roofvane—Ventilators. Sturtevant Co., B.F., Div. of Westinghouse Electric, Boston, Mass.
Roof-Vent—Ventilators. Reed Unit-Fans, Inc., New Orleans, La.
Rotameter—Flow meters. Schutte & Koerting Co., Philadelphia, Pa.
Rota-Roll—Pumps, fuel oil units. Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.
Rotary—Ventilators. Swartwout Co., Cleveland, O.
Roto Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.
Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Rotojet—Spray nozzles. Binks Mfg. Co., Chicago, Ill.
Roto-louvre—Dryers. Link-Belt Co., Chicago, Ill.
Roto-Torq—Tools. Richmont, Inc., Los Angeles, Calif.
Roto-trol—Liquid pressure regulators, indicators, and switches. Healy Ruff Co., St. Paul, Minn.
Ro-Twin—Air compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Roxaprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Roxite—Pipe. United States Stoneware Co., New York, N. Y.
Roxyn C—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Royal—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Royal Clipper—Cutters and shears. C-B Tool Co., Lancaster, Pa.
Rubalt—Enamels and lacquers. Hague & Co., Alfred, Brooklyn, N. Y.
Rubatex—Insulation. Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.
Runwel—Packing. Greene, Tweed & Co., New York, N. Y.
Rusco—Insulation. Russell Co., F. C., The, Cleveland, O.
Rust Bloc No. 20—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rustbuster—Cleaning compounds. Cannon Chemical Co., Inc., Everett, Mass.
Rust Evade—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rust Raider—Compounds. Radiator Specialty Co., Charlotte, N. C.
Rust Veto—Protective Coatings. E. F. Houghton & Co., Philadelphia.
Rydlyme—Cleaning compounds, scale removal service. Apex Engineering Co., Chicago, Ill.

S-A—Conveyors, feeders. Stephens-Adamson Mfg. Co., Aurora, Ill.
SA—Valves. Lunkenheimer Co., Cincinnati, O.
S. C.—Air heaters, gas burners, recorders. Surface Combustion Corp., Toledo, O.
S.F.E.—Insulation. Standard Fuel Engineering Co., Detroit, Mich.
S-N—Air conditioning units, burners, fans, heaters, pumps, stokers. Scott-Newcomb, Inc., St. Louis, Mo.
SOH—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
S & P—Burners, governors, preheaters, regulators, strainers, valves. Staples & Pfeiffer, San Francisco, Calif.
S. R. P.—Protective coatings. Sonneborn Sons, Inc., L., New York, N. Y.
SSIRCO—Ventilators. Southern States Iron Roofing Co., Savannah, Ga.
Saco—Speed reducers. Stephens-Adamson Mfg. Co., Aurora, Ill.
Saf-Dry—Refrigerants. Liquid Carbonic Corp., The, Chicago, Ill.
Safe-T-Aire—Air sterilizing units. Hanovia Chemical & Mfg. Co., Newark, N. J.
Safety—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Saftrol—Controls. Penn Electric Switch Co., Goshen, Ind.
Saint Louis—Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.
Sal-Mo—Cement, insulation, packing. Sall Mountain Co., Chicago, Ill.
Sanidaire—Humidifiers. United States Air Conditioning Corp., Minneapolis, Minn.
Sansteam—Boilers. J. O. Martin Co., Inc., San Francisco, Calif.
Santocel—Insulation. Monsanto Chemical Co., Merimac Div., Everett, Mass.
Santosite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.
Santrol—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Saran—Plastic pipe and tubing. Acadia Synthetic Products Div., Western Felt Works Chicago, Ill.
Satincote—Insulation, building. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.
Saunders—Pipe cutters. Erie Tool Works, Erie, Pa.
Saunders—Diaphragm valves. Grinnell Co., Inc., Providence, R. I.
Sauter—Time switches. Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Schmidt—Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.
Scotch Giant—Refrigerating compressors. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Scottie Jr.—Boilers. Kewanee Boiler Co., Kewanee, Ill.
Scruin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Scru-peller—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Sealdflow—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Sealeak—Compounds. Ampion Corp., Long Island City, N. Y.
Seal Master—Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.
Seal-Rite—Cement and compounds. Macksons Co., New York, N. Y.
Segweld—Pipe fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Seismo-Dampers—Bases. Korfund Co., Inc., Long Island City, N. Y.
Selectair—Air conditioning units. Johnson Co., S. T., Philadelphia, Pa.
Selectric—Electric heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Selectrol—Regulators. Automatic Control Co., St. Paul, Minn.
Sells—Bearings. Royersford Foundry & Machine Co., Royersford, Pa.
Sensatherm—Thermostats. Mercoid Corp., Chicago, Ill.
Sensitrol—Relays. Weston Electrical Instrument Corp., Newark, N. J.
Sentinel—Pumps. Red Jacket Mfg. Co., Davenport, Ia.
Sentry — Draft controls, draft regulators. Krueger Sentry Gauge Co., Green Bay, Wis.
Sep-return—Separators. Wabash Mfg. Co., Chicago, Ill.
Serrabestos—Gaskets. Johns-Manville, New York, N. Y.
Service—Packing. Johns-Manville, New York, N. Y.
Servicecoat—Enamels and lacquers. Debevoise Co., The, Brooklyn, N. Y.
Serviron—Coatings. Saverite Engineering Co., Hoboken, N. J.
Sesure—Gages. Yarnall-Waring Co., Philadelphia, Pa.
"77"—Pipe coverings. Eagle-Picher Co., Cincinnati, O.
Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.
Sheetrock—Sheets and board for ducts. United States Gypsum Co., Chicago, Ill.

Shelby—Tubing. National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Shield-Arc—Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.
Shockmounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Shone—Sewage ejectors. Yeomans Bros. Co., Chicago, Ill.
Shuntflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Shutlbrak—Switches. Adam Electric Co., Frank, St. Louis, Mo.
Shut-O-Vent—Louvers and shutters. Reed Unit-Fans, Inc., New Orleans, La.
Sierra-Air—Air conditioning units. International Sales Co., San Francisco, Calif.
Silastic—Compounds, packing. Dow Corning Corp., Midland, Mich.
Silent-Auburn—Burners, heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.
Silent Automatic—Dampers, louvers and shutters. Airecon Industries, Detroit, Mich.
Silentblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Silent-Breeze—Propeller fans. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Silentvane—Fans. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Sil-Fos—Solder. Handy & Harman, New York, N. Y.
Silicair—Insulation. Western Silicair Products, Inc., Burbank, Calif.
Silimite—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Silverlink—Chain drives. Link-Belt Co., Indianapolis, Ind.
Silver Magic—Welding compounds. Universal Power Corp., Cleveland, O.
Silver Steel—Cutters. E. C. Atkins & Co., Indianapolis, Ind.
Silverstreak—Chain drive. Link-Belt Co., Indianapolis, Ind.
Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.
Silvertop—Eliminators, traps. Anderson Co., V. D., The, Cleveland, O.
Simplex—Gages. Viking Pump Co., Cedar Falls, Ia.
Simplex—Regulators. Bell & Gossett Co., Morton Grove, Ill.
Sim-Trol—Controls. Simplex Mfg. Co., Fond du Lac, Wis.
Sioux—Electric drills. Albertson & Co., Inc., Sioux City, Ia.
Sirocco—Blowers. American Blower Corp., Detroit, Mich.
Skilbeck—Humidifiers. Techtmann Industries, Inc., Milwaukee, Wis.
Skip-Tooth—Dies. Nye Tool Co., Chicago, Ill.
Slenderized—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Slo-Speed—Reducers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Sludgout—Fuel oil treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Slugin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.
Smith-Mills—Boilers. Smith Co., Inc., H. B., Westfield, Mass.
Smithway—Electrodes, heaters, pumps, electric motors, arc welders. Smith Corp., A. O., Milwaukee, Wis.
Smoothcote—Insulation, building. Insulite Div., Minnesota & Ontario Paper Co., Minneapolis, Minn.
Snap-Rite—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Sno-Breeze—Air conditioning units, cooling surface. Palmer Mfg. Corp., Phoenix, Ariz.
Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Solray—Radiation. Weil-McLain Co., Michigan City, Ind.
Sol-vet—Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.
Sono-O-Seal—Insulation. General Insulating Products Co., Brooklyn, N. Y.
So-Salts—Solder. Turco Products, Inc., Los Angeles, Calif.
Soundliner—Insulation. Baldwin-Hill Co., Trenton, N. J.
Sovabead—Dehumidifiers. Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.
Spartan—Packing. Graton & Knight Co., Worcester, Mass.
Spatter Nox—Welding compounds. Universal Power Corp., Cleveland, O.
Spatter Off—Welding compounds. Universal Power Corp., Cleveland, O.
Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Speedarc—Electrodes. Universal Power Corp., Cleveland, O.
Speed Clamps—Hose clamps. Tinnerman Products, Inc., Cleveland, O.
Speed Clips—Insulation fasteners. Tinnerman Products, Inc., Cleveland, O.
Spee-Dee—Blue print and white print machines. Peck & Harvey, Chicago, Ill.
Speed-Flex—Flat belt drives. Gates Rubber Co., The, Denver, Colo.
Speed Heater—Unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Speed Nuts—Locknuts. Tinnerman Products, Inc., Cleveland, O.
Speed Prime—Pumps. Chain Belt Co., Milwaukee, Wis.
Speed-Trol—Changers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Speedweld—Electrodes. Trindl Products, Ltd., Chicago, Ill.
Speedylectric—Boilers. Livingstone Engineering Co., Worcester, Mass.
Speedyvent—Air eliminators. Livingstone Engineering Co., Worcester, Mass.
Spekaluminite — Coatings. Special Chemicals Corp., New York, N. Y.
Sphero—Blow-off valves. Fairbanks Co., New York, N. Y.
Spinner—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Spiralock—Pipe coils, tubing. B & M Mfg. Co., East Orange, N. J.
Spiralock—Pulleys and sheaves. Scientiae Tool Co., Dayton, Ohio.
Spiratube—Ducts and duct fittings. Flexible Tubing Corp., Branford, Conn.
Spiraweld—Pipes. Naylor Pipe Co., Chicago, Ill.
Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.
Spirodome—Spray nozzles. Cooling Tower Co., Inc., The, Div. of the Fluor Corp., Ltd., New York, N. Y.
Spirodome—Spray nozzles. Fluor Corp., Ltd., The, Los Angeles, Calif.
Spirotallic—Gaskets. Johns-Manville, New York, N. Y.
Spirovane—Fans. Western Blower Co., Seattle, Wash.
Spraco—Booths, nozzles, separators, strainers, washers. Spray Engineering Co., Somerville, Mass.
Spra-Rite—Nozzles. Binks Mfg. Co., Chicago, Ill.
Spray-Acoustic—Insulation. Sprayo Flake Co., Chicago, Ill.
Square-Heat—Boilers. Kewanee Boiler Corp., Kewanee, Ill.
Stabilflo—Valves. Foxboro Co., Foxboro, Mass.
Stack-Head—Dampers. Air Control Products, Inc., Coopersville, Mich.
Stacon—Regulators, valves. Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Sta-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Staidarc—Electrodes. Universal Power Corp., Cleveland, O.
Stainarc—Electrodes. Universal Power Corp., Cleveland, O.
Stainlend—Electrodes. Arcos Corp., Philadelphia, Pa.
Stainless—Cement and compounds. Grinnell Co., Inc., Providence, R. I.
Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Standard—Ventilators. Burt Mfg. Co., Akron, O.
Standco—Bearings. Standard Pressed Steel Co., Jenkintown, Pa.
Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.
Starbird—Pressure and vacuum switches. Meletron Corp., Los Angeles, Calif.
Statick—Ventilators. Hirschman-Pohle Co., Inc., Le Roy, N. Y.
Staxauster—Roof ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Staynew—Filters. Dollinger Corp., Rochester, N. Y.
Stazin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Steamjet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Steam-Pak—Steam generator unit, heaters. York-Shipley, Inc., York, Pa.
Sterilamp—Lamps. Westinghouse Electric Corp., Pittsburgh, Pa.
Sterlco—Controls, pumps, strainers, heating systems, regulators, traps, valves. Sterling, Inc., Milwaukee, Wis.
Sterling—Compressors, condensers, valves, pipe coils. Reynolds Mfg. Co., Springfield, Mo.
Stictite—Cement. Refractory & Insulation Corp., New York, N. Y.
Stillson—Pipe wrenches. Erie Tool Works, Erie, Pa.
Stok-A-Fire—Stokers. Automatic Firing Corp., St. Louis, Mo.
Stokerator—Stokers. Northern Steel & Stoker Corp., Peoria, Ill.
Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Storm Shade—Windows. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Strahman—Boiler gage cocks. Klingerit Inc., New York, N. Y.
Straitflo—Strainers. Hays Mfg. Co., Erie, Pa.
Streamaire—Unit heaters, radiation, cooling surface. Young Radiator Co., Racine, Wis.
Streamline—Couplings, cutters, fittings, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.
Stronghold—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Stud-Pak—Insulation. United States Mineral Wool Co., South Milwaukee, Wis.
Sturdybender—Power brakes. Bath Co., Cyril, The, Cleveland, O.
Submersion—Boilers, water heaters. Stout & Sons, David, St. Louis, Mo.
Sullarc—Electrodes. Universal Power Corp., Cleveland, O.
Sullivan—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Sunrad—Direct radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Super—Insulating cement. Union Asbestos & Rubber Co., Cicero, Ill.
Super Air Screws—Fans. Marathon Electric Mfg. Corp., Wausau, Wis.
Supercord—V belts. Browning Mfg. Co., Inc., Maysville, Ky.
Supercutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Super-deLavaud—Pipe. U. S. Pipe & Foundry Co., Burlington, N. J.
Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superex—Insulation. Johns-Manville, New York, N. Y.
Super-Fan—Fan blades. Norwin Co., Freeport, Ill.
Super-Felt—Insulation. Johns-Manville, New York, N. Y.
SuperFex—Furnaces, heaters. Perfection Stove Co., Cleveland, O.
Superflex—Drives. Gates Rubber Co., The, Denver, Colo.
Superflux—Solder. Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Superheat—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.
Superior—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Superior—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superjustable—Adjustable wrenches. Williams & Co., J. H., Buffalo, N. Y.
Super-Power—Drives. Baldwin Belting, Inc., New York, N. Y.
Superratchet—Ratchet wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Super-S—Gages. Klingerit, Inc., New York, N. Y.
Superseal—Fittings. Grinnell Co., Inc., Providence, R. I.
Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Super Silvertop—Traps. The V. D. Anderson Co., Cleveland, O.
Super "66"—Insulation. Eagle-Picher Co., Cincinnati, O.
Supersocket—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Supertan—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Supertemp—Insulation. Eagle-Picher Co., Cincinnati, O.
Super Thermo Stucco—Cement. Chicago Fire Brick Co., Chicago, Ill.
Super X—Sheets. Western Brass Div. of Olin Industries, Inc., East Alton, Ill.
Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Sure Return—Condensation return pumps. Chicago Pump Co., Chicago, Ill.
Surevent—Valves. Gorton Heating Corp., Cranford, N. J.
Sureweld—Electrodes, welders. National Cylinder Gas Co., Chicago, Ill.
Sweatflow—Valves. Quality Specialty Co., Inc., Philadelphia, Pa.
Sylphon—Bellows, joints, operators, regulators, valves. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Synchro—Valves. The Bristol Co., Waterbury, Conn.
Synchro-Lectric—Viscosimeters. Brookfield Engineering Laboratories, Stoughton, Mass.
Synchro-Meter—Meters. Bailey Meter Co., Cleveland, O.
Synchron—Motors. Hansen Mfg. Co., Inc., Princeton, Ind.
Synchro-Thermetron—Heating systems. Whittington Pump & Engineering Corp., Indianapolis, Ind.
Synchrotie—Recorders. Westinghouse Electric Corp., Pittsburgh, Pa.
Syncretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Syncrogear—Speed reducers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Syndolag—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Syphonaire—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

T.T.—Smoke guns. Hill, E. Vernon, Chicago, Ill.
Tabasco—Water heaters. Kewanee Boiler Corp., Kewanee, Ill.
Tag—Humidistats, hygrometers, gages, indicator-controllers operators, thermostats, manometers, meters, psychrometers, recorders, regulators, thermometers, valves. Tagliabue Corp., C. J., Newark, N. J.
Tampico—Air filters. Chicago Filter Co., Joliet, Ill.
Tampin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Tank-Kleen—Fuel oil treatment. Celco Corp., New York, N. Y.
Tank-O-Meter—Gages, indicators. Uehling Instrument Co., Paterson, N. J.
Tanktrol—Regulators. Automatic Control Co., St. Paul, Minn.
Tannate—Belting, packing. Rhoads & Sons, J. E., Philadelphia, Pa.
Tannate-Rockwood—Belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.
TEG—Filters, humidifiers, sterilizing units. National Air Conditioning Inc., Johnstown, Pa.
Teksag Colloid—Boiler cleaning compounds. Agnew & Tomlinson, Long Island City, N. Y.
Telemaster—Relays. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Teletrol—Window ventilator units. Airgard Mfg. Co., Chicago, Ill.
Televisor—Gages. Schutte & Koerting Co., Philadelphia, Pa.
Tellevel—Indicators, switches. Stephens-Adamson Mfg. Co., Aurora, Ill.
Teltru—Anemometers, gages. Hill, E. Vernon, Chicago, Ill.
Tem-Clock (Electric)—Time switches. Penn Electric Switch Co., Goshen, Ind.
Temlok—Insulation. Armstrong Cork Co., Lancaster, Pa.
Temperator—Unit air conditioners. Dunham Co., C. A., Chicago, Ill.
Tempmaster—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Temprvte—Windows. Trucson Steel Co., Youngstown, O.
Tempscribe—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Temptrol—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Temtrol—Thermostats. Penn Electric Switch Co., Goshen, Ind.
Tensulate—Insulation. Tennessee Products and Chemical Corp., Nashville, Tenn.
Texiron—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texrope—V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texsteel—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Textolite—Insulation, tubing. General Electric Co., Chemical Dept., Pittsfield, Mass.
Thag—Air heaters. Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Tharco—Cement. The Armstrong Co., Detroit, Mich.
Thawzone—Dehydrant and acid neutralizer. Highside Chemicals Co., Newark, N. J.
Therhumiter—Thermometers. Weksler Thermometer Corp., New York, N. Y.
Thermalbridge—Thermometers. Thompson Research & Mfg. Co., Davenport, Fla.
Thermal Electric—Heaters, pipe, preheaters, transformers. Fluid Systems, Inc., New Haven, Conn.
Thermafuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermalfin—Unit coolers. Thermal Co., Inc., Milwaukee, Wis.
Thermascrete—Refractories. Munn and Steele, Inc., Newark, N. J.
Thermatrol—Valves. Schnacke, Inc., Evansville, Ind.
Therm-Cote—Radiation. Tilco-Fin-Tubing Div., of David E. Kennedy, Inc., Brooklyn, N. Y.
Thermek—Heating and cooling surface. Peerless of America, Inc., Chicago, Ill.
Thermidaire—Burners, furnaces, heaters. Campbell Heating Co., E. K., Kansas City, Mo.
Thermix—Dust collectors, fans, blowers, heat exchangers. Prat-Daniel Corp., East Port Chester, Conn.
Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.
Thermo—Heaters. American Furnace Co., St. Louis, Mo.
Thermobloc—Furnaces, unit heaters. Prat-Daniel Corp., East Port Chester, Conn.
Thermochek—Controls. Bell & Gossett Co., Morton Grove, Ill.
Thermo-Draulik—Operators, regulators. Perfex Corp., Milwaukee, Wis.
Thermodrive—Speedchangers, pulleys and sheaves. Webster Electric Co., Racine, Wis.
Thermoflex—Strainers, heating systems, radiator orifices, traps, valves. Cashin Co., W. D., Boston, Mass.
Thermoflo—Valves. Bell & Gossett Co., Morton Grove, Ill.
Thermo-Flow—Heat exchangers. Thermal Industries, Indio, Calif.
Thermofuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermogage—Thermometers. Hotstream Heater Co., Cleveland, O.
Thermogas—Furnaces, duct and unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermo Grip—Torches. Ideal Industries, Inc., Sycamore, Ill.
Thermoguide—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.
Thermoil—Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermolator—Valves. Triplex Heating Specialty Co., Inc., Peru, Ind.
Thermolier—Unit heaters. Grinnell Co., Inc., Providence, R. I.
Thermo-Limit—Valves. Alco Valve Co., St. Louis, Mo.
Thermopane — Windows. Libbey-Owens-Ford Glass Co., Toledo, O.
Thermoswitch—Thermostats. Fenwal, Inc., Ashland, Mass.
Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.
Thermotrol—Valves. Sterling Engineering Co., Milwaukee, Wis.
Therm-otrols—Thermometers. Wheelco Instruments Co., Chicago, Ill.
Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Thermovoir—Water heaters. Bell & Gossett Co., Morton Grove, Ill.
Thin Man—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.
Thor—Drills, pumps, reamers, shears, valve reseaters. Independent Pneumatic Tool Co., Chicago, Ill.
Thorobred—V belts and v belt drives. Dayton Rubber Co., Dayton, O.
Thread King—Portable machines. Century Engineering Co., Los Angeles, Calif.
Thredolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.
3C—Motor controls. Clark Controller Co., Cleveland, O.
Thrift—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Throway—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Thur-Ma-Lox—Coatings. Dampney Co. of America, Hyde Park, Boston, Mass.
Ticotherm—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Tilt Trap—Steam traps. Nason Co., Detroit, Mich.
Timercoid—Time switches. Mercoid Corp., Chicago, Ill.
Timerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Time Saver—Damper regulators. Goese Mfg. Co., Milwaukee, Wis.
Timetrol (Manual)—Time switches. Penn Electric Switch Co., Goshen, Ind.
Tin-Ezy—Coatings, solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Tin-Loy—Solder. Eagle-Picher Co., Cincinnati, O.
Tiny—Traps. Nason Co., Detroit, Mich.
Titan—Traps. Nason Co., Detroit, Mich.
Tite—Caulking compounds. Krehbiel Co., J. H., Chicago, Ill.
Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.
Titus Airfoil—Diffusers, grilles, registers. Titus Mfg. Corp., Waterloo, Ia.
Tom Thumb—Pipe machines. Oster Mfg. Co., Cleveland, O.
Toolarc—Electrodes. Universal Power Corp., Cleveland, O.
Toolweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Torchweld—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Torkflash—Wrenches. Blackhawk Mfg. Co., Milwaukee, Wis.
Tork Master—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torkotherm—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torpedo—Dehydrators, filters. Imperial Brass Mfg. Co., Chicago, Ill.
Torqometer—Torque indicating wrenches. Snap-on Tools Corp., Kenosha, Wis.
Torq-Stop—Wrenches. Richmont, Inc., Los Angeles, Calif.
Trace—Refrigerant leak detectors. Highside Chemicals Co., Newark, N. J.
Transaxil—Flame failure controls. Mettler Co., Lee B., Los Angeles, Calif.
Transflex—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Transite—Conduit, pipe, ducts and duct fittings, refractories, sheets and board. Johns-Manville, New York, N. Y.
Transparent — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Trap-Dri—Dehydrators. Automatic Products Co., Milwaukee, Wis.
Trap-it—Filters. Automatic Products Co., Milwaukee, Wis.
Trap Nest—Insulation. Wilson, Inc., Grant, Chicago, Ill.
Travertone—Insulation. Armstrong Cork Co., Lancaster, Pa.
Tray—Cooling towers. New England Cooling Tower Co., Boston, Mass.
Treet-O-Control—Steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.
Treet-O-Unit—Feeders, pumps. % Proportioneers, Inc. %, Providence, R. I.
Trentweld—Tubing. Trent Tube Mfg. Co., East Troy, Wis.
Triad—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.
Tri-Clad—Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.
Trident—Meters. Neptune Meter Co., New York, N. Y.
Tri-Flex—Registers, grilles. Tuttle & Bailey, Inc., New Britain, Conn.
Tri-Flux—Solder. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Trimo—Cutters, tongs, vises, wrenches. Trimount Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Trimo—Cutters. Erie Toolworks, Erie, Pa.
Trimtherm—Thermostats. General Controls Co., Glendale, Calif.
Triple-A—Enamels and lacquers, protective coatings. Quigley Co., Inc., New York, N. Y.
Triple Duty—Heating systems. Bell & Gossett Co., Morton Grove, Ill.
Triple-Seal—Fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Triplex—Stocks and dies. Nye Tool Co., Chicago, Ill.
Tripl-Mix—Cement. Krehbiel Co., J. H., Chicago, Ill.
Tri-Rotor—Pumps. Yale & Towne Mfg. Co., Stamford, Conn.
Tri-trol — Regulators, switches, thermostats. Marsh Heating Equipment Co., Chicago, Ill.
Triumph—Gaskets. Johns-Manville, New York, N. Y.
Triumph—Liquid level gages and indicators. Boston Auto Gage Co., Pittsfield, Mass.
Trojan—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Trojan—Stokers. Auburn Burner Co., Auburn, Ind.
Tropelite—Coatings. Tropical Paint & Oil Co., Cleveland, O.
Tropicalk—Compounds. Tropical Paint & Oil Co., Cleveland, O.
Tropic-Breeze—Air conditioning units. Dalzen Tool & Mfg. Co., Detroit, Mich.
Tropilux—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
Tru-Air—Air conditioning units. Blazer, M., & Son, Passaic, N. J.
Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Truliradiant—Gas burners. Gold Top Heating, Inc., Butte, Mont.
Trumark—Protractor for marking pipe. Tru-Line Corp., Los Angeles, Calif.
Try-Me—Regulators, strainers, valves. Tryco Products, Inc., Westfield, Mass.
Tubejet—Compressors, ejector type vacuum pump. Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Tube Master—Flaring tools. Leonard Precision Products Co., Garden Grove, Calif.
Tuff-Bond—Compounds, adhesives. Moore Co., Goodloe E., Danville, Ill.
Tuff-Cote—Adhesives, cement. Moore Co., Goodloe E., Danville, Ill.
Tuf-flex—Gage and sight glasses. Libbey-Owens-Ford Glass Co., Toledo, O.
Tuf-On—Protective coatings. Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Tulox—Plastic pipe and tubing. Extruded Plastics, Inc., Norwalk, Conn.
Turbine Driven—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Turbo—Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis.
Turbo Vane—Fans and blowers. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Turbulaire — Dryers. Western Precipitation Corp., Los Angeles, Calif.
Turret—Pumps. Yeomans Bros. Co., Chicago, Ill.
Tuway—Strainers. Wright-Austin Co., Detroit, Mich.
20th Century—Bearings. Roller Bearing Co., of America, Trenton, N. J.
Twin Contact—Controls, switches, thermostats. Perfex Corp., Milwaukee, Wis.
Twindow—Heat insulating windows. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Twin G-Fin—Preheaters. Griscom-Russell Co., The, New York, N. Y.
Twin-Line — Pumps. Cooper-Bessemer Corp., The, Mt. Vernon, O.
Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.
Tygon—Protective coatings, plastic tubing. U. S. Stoneware Co., New York, N. Y.
Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.
Tymit—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Tytecote—Insulation. Specialty Converters, Inc., East Braintree, Mass.

U. F. S.—Clamps. Grinnell Co., Inc., Providence, R. I.
U. S.—Valves. Powell Co., Wm., Cincinnati, O.
US-Capitol—Boilers, hangers or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
US-Capitolaire—Furnaces, air conditioning units. United States Radiator Corp., Detroit, Mich.
USG—Louvers and shutters. United States Gypsum Co., Chicago, Ill.
U. S. S.—Angles, sheets. Carnegie-Illinois Steel Corp., United States Steel Corp., Subsidiary, Pittsburgh, Pa.

U. S. S.—Pipe, tubing. National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
U-S-S—Sheets. Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.
USS—Sheets. Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
UTA—Pumps. American-Marsh pumps, Inc., Battle Creek, Mich.
Ugasco—Gaskets. United States Gasket Co., Camden, N. J.
U-Loy—Sheets. Republic Steel Corp., Cleveland, O.
Unaflo—Steam engines. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Unamatic—Automatic arc welding equipment. Una Welding, Inc., Cleveland, O.
Unarco—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Unibestos—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Unichrome—Enamels and lacquers. United Chromium, Inc., New York, N. Y.
Unicoils—Air conditioning unit. Clarage Fan Co., Kalamazoo, Mich.
Uniduct—Ducts and duct fittings. General Corporation, Minneapolis, Minn.
Uni-fin—Air diffusers, dampers, grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflex—Metal hose. Brockway Co., Naugatuck, Conn.
Uni-flo—Dampers, diffusers, grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflow—Oil burners. Ace Engineering Co., Chicago, Ill.
Union—Valves. Powell Co., Wm., Cincinnati, O.
Unipack—Welding fume exhausters, centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Uniplastic—Furnace and insulating cement, insulation. Robinson Insulation Co., Great Falls, Mont.
Unipump—Pumps. Weinman Pump Mfg. Co., Columbus, O.
Unishears—Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Unisorb—Bases and pads. Felters Company, The, Boston, Mass.
Unitaire—Air conditioning units. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.
Unitherm—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
UniTrane—Air conditioning units. Trane Co., The, La Crosse, Wis.
Unitrol — Regulators, switches, thermostats. Marsh Tritrol Co., Chicago, Ill.
Unitrol—Valves. Kieley & Mueller, Inc., North Bergen, N. J.
Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.
Universal—Burners. Dalzen Tool & Mfg. Co., Detroit, Mich.
Universal—Cast iron pipe. Central Foundry Co., New York, N. Y.
Universal—Centrifugal pumps. Bell & Gossett Co., Morton Grove, Ill.
Universal—Gas and oil burners. Mettler Co., Lee B., Los Angeles, Calif.
Universal—Packing. Johns-Manville, New York N. Y.
Universal—Pipe cutters. Nye Tool Co., Chicago, Ill.
Universal—Regulators. Dockson Corp., Detroit, Mich.
Universal Unaflow—Engines. Skinner Engine Co., Erie, Pa.
Upson—Bolts and studs. Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
usAIRco—Air conditioning equipment, blowers, condensers, fans, grilles, heaters. United States Air Conditioning Corp., Minneapolis, Minn.
Uskon—Conductors. United States Rubber Co., New York, N. Y.
Utility—Blowers. American Blower Corp., Detroit, Mich.
Utility—Compressors. Schramm, Inc., West Chester, Pa.
Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

V*S—Changers. Reliance Electric & Engineering Co., Cleveland, O.
Vac-Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Vacumatic—Ejectors, pumps. Whittington Pump & Engineering Corp., Indianapolis, Ind.
Vacuumstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Vad—Cooling towers. Young Radiator Co., Racine, Wis.
Valcalox—Damper regulators. Young Regulator Co., Cleveland, O.
Valdura—Caulking compound, rubber base enamel. American-Marietta Co., Chicago, Ill.
Valpit—Unions. Pittsburgh Valve & Fittings Corp., Barberton, O.
Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.
Valvrator—Valves. Fischer & Porter Co., Hatboro, Pa.
Vaporene—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Vaporstat — Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Varidrive—Speed changers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Varipitch—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Vari-Pitch—Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Variport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Vari-Vent—Air and vacuum valves. Dole Valve Co., Chicago, Ill.
Veeco—Leak detectors. Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
Vee Jet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Veelos—V-belts. Manheim Mfg. & Belting Co., Manheim, Pa.
Velometer—Air velocity meters, anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Venko—Boilers. Waterfilm Boilers, Inc., Jersey City, N. J.
Ventalarm—Alarms. Scully Signal Co., Cambridge, Mass.
Vento—Traps. Haines & Co., William S., Philadelphia, Pa.
Vent-Rite—Air valves. Anderson Products, Inc., Cambridge, Mass.
Ventube—E. I. du Pont de Nemours & Co., Inc., Fabrics & Finishes Dept., Wilmington, Del.
Ventura—Fans. American Blower Corp., Detroit, Mich.
Venturafin—Unit heaters. American Blower Corp., Detroit, Mich.
Venturi—Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.
Venturi—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Venturi-Flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.
Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vercoustic—Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vermiculite—Insulation. International Vermiculite Co., Girard, Ill.
Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Versalend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Versa-Tool—Electric drills. York Electric & Machine Co., York, Pa.
Vertical—Unit heaters. American Blower Corp., Detroit, Mich.
Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.
Vescote—Coatings. Vesco Corp., New York N. Y.
V-Flat—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vibracork—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibrasafe—Absorbers. Pleasantaire Corp., Washington, D. C.
Vibrashock—Absorbers, bases and pads. Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Vibra-sorber—Vibration absorbers. Chicago Metal Hose Corp., Maywood, Ill.
Vibro-Bar—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibro-Dampers—Bases. Korfund Co., Long Island City, N. Y.
Vibro Insulators—Bases. Goodrich Co., B. F., Akron, O.
Vibro-Isolator—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Victron—Electric motors, louvers and shutters, propeller fan blades and fans. Victor Electric Products, Inc., Cincinnati, O.
Vim—Gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.
Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Visaflame—Controls. Mercoid Co., The, Chicago, Ill.
Visoleak—Detectors. Western Thermal Equipment Co., Los Angeles, Calif.
Vistand—Vise stands. Armstrong Mfg. Co., Bridgeport, Conn.
Vitalaire—Air conditioning units. Ice Cooling Appliance Corp., Morrison, Ill.
Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.
Vitra-Carlite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Vitricel—Refractories. Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Vitriram—Furnace cement. U. S. Stoneware Co., New York, N. Y.
Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.
V-Meth-L—Refrigerant. Virginia Smelting Co., West Norfolk, Va.
Voladjuster—Dampers. Barber-Colman Co., Rockford, Ill.
Volcano—Ventilators. Iwan Brothers, South Bend, Ind.
Volocitrol—Louvers, regulators. Barber-Colman Co., Rockford, Ill.
Vornado—Fans. Sutton Corp., O. A., Beacon Bldg., Wichita, Kan.
Vortex—Pumps. Lawrence Pump & Engine Co., Lawrence, Mass.
Vortex—Nozzles. Phillips Cooling Tower Co., Inc., New York, N. Y.
V-tite—Gaskets, Johns-Manville, New York, N. Y.
V-to-V—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vulcalock—Fittings, pipe, tanks, valves. Goodrich Co., B. F., Akron, O.
Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcan—Stokers. Canton Stoker Corp., Canton, O.
Vulcan Superior—Tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcatex—Compounds. Horn Co., A. C., Long Island City, N. Y.
Vulco—Belts, drives, pulleys. Gates Rubber Co., Denver Colo.
Vulco Mount—Pulleys. Gates Rubber Co., Denver, Colo.
Vynal—Coatings. Watson-Standard Co., Pittsburgh, Pa.
Vyncote—Coatings. Watson-Standard Co., Pittsburgh, Pa.

W. & McD.—Strainers. Watson & McDaniel Co., Philadelphia, Pa.
W-S—Fittings. Watson-Stillman Co., Roselle, N. J.
W & T—Anemometers, feeders, gages indicators, hygrometers, meters, relays. Wallace & Tiernan Co., Inc., Newark, N. J.
W & W—Pipe hangers. Western Wire Products Co., St. Louis, Mo.
Walco-Parmelee — Wrenches. Walworth Co., New York, N. Y.
Walltube—Radiator brackets. Arjac Products Inc., Rochester, N. Y.
Walseal Silbraz—Fittings, valves. Walworth Co., New York, N. Y.
Warco — Combustion chambers, refractories. Walsh Refractories Corp., St. Louis, Mo.
Warco—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Wat-a-mat—Water meters. Pfening Co., Fred D., Columbus, O.
Watco—Cooling towers, humidifiers, spray nozzles, spraying systems. Water Cooling Corp., New York, N. Y.
Water-Boy—Feeders. Maid-'O-Mist, Inc., Chicago, Ill.
Water-King—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Water-Maker—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Watrola—Water heaters. George E. Swett & Co., San Francisco, Calif.
Way Loctor—Doors and panels. Walsh, The, L. M., Co., Boston, Mass.
Wear-Proof—Pumps. Schneible Co., Claude B., Detroit, Mich.
Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Weathermaker—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weather-Man—Regulators, switches, thermostats. Automatic Devices Co., Chicago, Ill.
Weathermaster—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weathermatic—Hot water heating systems. Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Weatherwood—Insulation. United States Gypsum Co., Chicago, Ill.
Webco—Brakes. Webb Machine & Tool Co., Coraopolis, Pa.
Webster-Nesbitt—Unit heaters. Webster & Co., Camden, N. J.
Webster-Nesbitt "Little Giant"—Unit heaters. Nesbitt, Inc., John J. Philadelphia, Pa.
Weco—Gas burners. Webster Engineering Co., Tulsa, Okla.
Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa.
Weir—Furnaces, stokers, heaters. Meyer Furnace Co., The, Peoria, Ill.
Weiralead—Lead alloy coated sheets. Weirton Steel Co., Weirton, W. Va.
Weirzin—Electrolytic zinc coated sheets. Weirton Steel Co., Weirton, W. Va.
Weldells—Welding fittings. Taylor Forge & Pipe Works, Chicago, Ill.
Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.
Weldotrol—Spot welders. Westinghouse Electric Corp., East Pittsburgh, Pa.
WesCo—Solenoids. West Coast Electric Mfg. Co., Los Angeles, Calif.
Wesco Giant—Furnaces. Northwest Foundry & Furnace Co., Portland, Ore.
Westco—Fans. Northwest Foundry and Furnace Co., Portland, Ore.
Western—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Westernaire—Fans. Western Engineering & Mfg. Co., Los Angeles, Calif.
Westherm VisOdry — Dehydrators. Western Thermal Equipment Co., Los Angeles, Calif.
Westo—Water treatment. Western Chemical Co., Kansas City, Mo.
Whirlcone — Spray nozzles. Water Cooling Equipment Corp., St. Louis, Mo.
Whirljet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Whisper-Quiet—Heaters. Zink Co., John, Tulsa, Okla.

White Star—Valves. Powell Co., Wm., Cincinnati, O.
Whitson—Steam traps. Healy Ruff Co., St. Paul, Minn.
Whiz—Drills. Paramount Products Co., New York, N. Y.
Wilco—Bi-metals. Wilson Co., H. A., The, Newark, N. J.
Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Williams-Hager—Valves. Williams Gauge Co., The, Pittsburgh, Pa.
Wilmington—Air compressors. Electric Sprayit Co., The, Sheboygan, Wis.
Windmotor—Roof ventilators. Airecon Industries, Detroit, Mich.
Wind-O-Cool—Fans. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans, La.
Wingfoil—Fans, ventilators. Wing Mfg. Co., L. J., New York, N. Y.
Winkler—Burners, stokers. U. S. Machine Corp., Lebanon, Ind.
Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.
Wissco—Grilles. Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Witch—Bolts, hangers, protectors. Carpenter & Paterson, Inc., East Boston, Mass.
Wolverine—Heat exchangers, unit heaters, air conditioning units. Airecon Industries, Detroit, Mich.
Wonder—Tubing benders. American Pipe Bending Machine Co., Poultney, Vt.
Workhorse—Motors. Crozier Machine Tool Co., Hawthorne, Calif.

X-L — Gaskets, packing. Excelsior Leather Washer Co., Rockford, Ill.
Xacto—Meters. Bowser, Inc., Fort Wayne, Ind.
"X" Boilerliquid—Compounds. X Laboratories, Inc., New York, N. Y.
"X" Flush-Rustoff—Boiler cleaning compounds. X Laboratories, Inc., New York, N. Y.
"X" Pipejoin—Cement and compounds. X Laboratories, Inc., New York, N. Y.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Yager's—Solder. Benson Co., Inc., Alex R., Hudson, N. Y.
Yarway—Alarms, clamps, expansion joints, recorders, nozzles, strainers, traps, valves. Yarnall-Waring Co., Philadelphia, Pa.
Yellow-Jacket—Heating boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Yemco—Water heaters. York Electric & Machine Co., York, Pa.
Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.
Yorkaire—Unit air coolers. York Corp., York, Pa.
York-Heat—Heating equipment. York-Shipley, Inc., York, Pa.
York-Power—Oil burners. York-Shipley, Inc., York, Pa.

Zapon—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Z-Crete—Insulation. Zonolite Co., Chicago, Ill.
Zecret—Insulation. Robinson Insulation Co., Great Falls, Mont.
Zeph Air—Heaters. Twentieth Century Heating and Ventilating Co., Akron, O.
Zero—Cement, refractories. Standard Fuel Engineering Co., Detroit, Mich.
Zerolite—Insulation. Johns-Manville, New York, N. Y.
Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.
Zincgrip—Sheets. Armco Steel Corp., Middletown, O.
Zincilate—Coatings. Industrial Metal Protectives, Inc., Dayton, O.
Zinc Soot—Soot destroyers. Tamms Silica Co., Chicago, Ill.
Zone-Master—Heating systems. W-H Engineering Co., Chicago, Ill.
Zone-Pac—Heating systems. Barber-Colman Co., Rockford, Ill.
Zono—Combustion chambers. Robinson Insulation Co., Great Falls, Mont.
Zonolite—Insulation, refractories and refractory cement. Robinson Insulation Co., Great Falls, Mont.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 3—MANUFACTURERS' ADDRESSES

A

A. & A. Register Co., 8327 Clinton Rd., Cleveland 9, O.
A & J Co., 844-848 W. 59th St., Chicago 21, Ill.
A-J Mfg. Co., 2119 Washington St., Kansas City, Mo.
Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago, Ill.
Accurate Sheet Metal Mfg. Works, 2336-38 Milwaukee Ave., Chicago 47, Ill.
Ace Electric Corp., Bedford, Ind.
● Ace Engineering Co., 1435 W. 15th St., Chicago 8, Ill.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Organization, Inc., W. M., 3167 Fulton Rd., Cleveland 9, O.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles 11, Calif.
Acme Equipment Co., 205-13 E. Broadway, Muskogee, Okla.
● Acme Industries, Inc., Cor. Mechanic and Ganson Sts., Jackson, Mich.
Acme Mfg. Co., State Rd. below Rhawn St., Holmesburg, Philadelphia 36, Pa.
Acme Refining Co., The, W. 56th & W. & L. E. Ry., Cleveland, O.
Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit 11, Mich.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acro Welder Mfg. Co., 1825 W. St. Paul Ave., Milwaukee 3, Wis.
Acro Electric Co., 1305 Superior Ave., Cleveland 14, O.
Acrow, Inc., 155 W. Washington St., Newark, N. J.
Adam Electric Co., Frank, 3650 Windsor St., St. Louis, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 225-7 E. Park Dr., Buffalo 17, N. Y.
Adelta Mfg. Co., Inc., 21 & Ellsworth, Philadelphia 46, Pa.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Electric & Relay Co., 1260 W. Second St., Los Angeles 26, Calif.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
● Aerofin Corp., 410 S. Geddes St., Syracuse 1, N. Y.
Aeroil Products Co., Park Ave. at 57th St., West New York, N. J.
Aeroquip Corp., 300 S. East Ave., Jackson, Mich.
Aerotec Corp., The, Greenwich, Conn.
Aerovent Fan Co., Inc., 710 E. Ash St., Piqua, O.
Agaloy Tubing Co., Springfield, O.
Aget-Detroit Co., 613 First National Bank Bldg., Ann Arbor, Mich.
Agnew Electric Co., Milford, Mich.
Agnew & Tomlinson, 10-26 Jackson Ave., Long Island City 1, N. Y.
Ahlberg Bearing Co., 3081 W. 47th St., Chicago 32, Ill.
● Air Conditioning Products Co., 2340 W. Lafayette Blvd., Detroit 16, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, O.
Air Correctives Inc., 441 Lexington Ave., New York 17, N. Y.
● Air Devices, Inc., 17 E. 42nd St., New York 17, N. Y.
Airecon Industries, 2536 14th St., Detroit 16, Mich.
Air Equipment Co., 1713 W. Carroll Ave., Chicago 12, Ill.
Air Equipment Co., 2730 Zuni St., Denver, Colo.
● Air Filter Corp., 108 N. Water St., Milwaukee 2, Wis.
Air Purification Service, Inc., 82 Plane St., Newark 2, N. J.
Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.
● Air & Refrigeration Corp., 475 Fifth Ave., New York 17, N. Y.
Airborne Industries Inc., 628 Colfax Ave. N., Minneapolis 11, Minn.
Aire-Foile Fan & Blower Co., 4737 W. Vernor Highway, Detroit, Mich.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airkem, Inc., 7 East 47th St., New York, N. Y.
Airjet Ventilator Co., 35 N. Raymond Ave., Pasadena 1 ,Calif.
Airmaster Corp., 4317 Ravenswood Ave., Chicago 13, Ill.
Air-Maze Corp., 5200 Harvard Ave., Cleveland 5, O.
Air-O-Cel Co., 22000 Woodward Ave., Detroit 20, Mich.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
Airtemp, Div. of Chrysler Corp., 1600 Webster St., Dayton 1, O.
● Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airwasher Corp., 1122 N. Washington Ave., Lansing, Mich.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., 216-220 E. Front St., Cincinnati 2, O.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Akwa Heaters, Inc., 1955 Park Ave., New York 35, N. Y.
Alabama Pipe Co., Anniston, Ala.
● Aladdin Heating Corp., 2222 San Pablo Ave., Oakland 12, Calif.
Albertson & Co., Inc., Sioux City 3, Ia.
● Alco Valve Co., 861 Kingsland Ave., St. Louis 5, Mo.
● Aldrich Co., The, 105 Williams St., Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alert Engineering Products, 315 W. Woodbridge St., Detroit 26, Mich.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
Alfol Insulation Co., Inc., 155 E. 44th St., New York 17, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.
Allen Billmyre Div., Lamson Corp., Syracuse 1, N. Y.
● Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.
Allen Ventilator Div., Production Planning Co., 704 Woodward, Rochester, Mich.
Allen Co., Inc., L. B., 6702 Bryn Mawr Ave., Chicago 31, Ill.
Alliance Mfg. Co., Alliance, O.
Allied Control Co., Inc., 2 East End Ave., New York, N. Y.
Allied Control Valve Div., Skinner Chuck Co., Norwalk, Conn.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 4, Ind.
Allington & Curtis Mfg. Co., 1800 Holland Ave., Saginaw, Mich.
● Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee 1, Wis.
Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 7, Wis.
Alloy Steel Products Co., 1506 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N. Y.
Alphil Spot Welding Co., 1058 Pacific St., Brooklyn, N. Y.
Alrose Chemical Co., Box 1294, Providence, R. I.
Alsoco Corp., 10 E. 52nd St., New York, N. Y.
Altens Foundry & Machine Works, Inc., 226 W. Wheeling St., Lancaster, O.
Alton Mfg. Co., 1112 Ross Ave., Dallas 2, Tex.
Alton Mineral Wool Insulation Co., 2317 Whittemore Pl., St. Louis 4, Mo.
Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19, Pa.
Amercoat Div., American Pipe & Construction Co., 4809 Firestone Blvd., South Gate, Calif.
Amerform Corp., Real Estate Trust Bldg., Philadelphia 7, Pa.
American Agile Corp., 5806 Hough Ave., Cleveland 3, O.
American Air Conditioning Co., Boulevard Bldg., Detroit, Mich.
● American Air Filter Co., Inc., 373 Central Ave., Louisville 8, Ky.
American Automatic Typewriter Co., 614 N. Carpenter St., Chicago, Ill.
● American Blower Corp., Detroit 32, Mich.
American Brass Co., 414 Meadow St., Waterbury 88, Conn.
American Car & Foundry Co., 30 Church St., New York 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Chemical Paint Co., Brookside Ave., Ambler, Pa.
American Coal Burner Co., 12-20 E. Erie St., Chicago 11, Ill.
American Coils Co., 360 Thomas St., Newark 5, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.
American Die & Tool Co., Inc., 3rd & Greenwich Sts., Reading, Pa.
American District Steam Co., 25 Bryant St., North Tonawanda, N. Y.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Aramingo Ave. and Cumberland St., Philadelphia 25, Pa.
American Felt Co., Glenville, Conn.
American Flange & Mfg. Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y.
American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie, Pa.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 2719-31 Delmar Blvd., St. Louis 3, Mo.
American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Hair & Felt Co., 1828 Merchandise Mart, Chicago 54, Ill.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.
American Heat Corp., 1044 Little Bldg., Boston, Mass.
American Hydrovac Inc., 290 Scholes St., Brooklyn 6, N. Y.
American Injector Co., 1481-14th St., Detroit 16, Mich.
American Instrument Co., Silver Spring, Md.
American K. A. T. Corp., 331 Madison Ave., New York 17, N. Y.
American-Larson Ventilation Co., 1004 Keystone Bank Bldg., Pittsburgh 22, Pa.
American Locomotive Co., Alco Products Div., 30 Church St., New York 8, N. Y.
American Locomotive Co., Diesel Engine Div., Auburn, N. Y.
American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
American Manganese Bronze Co., Rhawn & Hegerman Sts., Philadelphia, Pa.
American-Marietta Co., 43 E. Ohio St., Chicago 11, Ill.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., The, 698 S. Main St., Waterbury 88, Conn.
American Metal Products Co., 4901 Marsalis Ave., Box 7036, Sylvania Sta., Fort Worth 9, Tex.

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American Meter Co., Inc., 60 E. 42nd St., New York 17, N. Y.
American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Molded Products Co., 1644 N. Honore St., Chicago 22, Ill.
American Nickeloid Co., 113 Second St., Peru, Ill.
American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
American Pipe Bending Machine Co., Inc., 17 Furnace St., Poultney, Vt.
American Pipe Tool Co., 4856 W. Kinzie St., Chicago 44, Ill.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
● American Radiator & Standard Sanitary Corp., P. O. Box 1226, Pittsburgh 30, Pa.
American Screw Co., 21 Stevens St., Providence, R. I.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Shipbuilding Co., Ft. W. 54th St., Cleveland 2, O.
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.
American Steel Band Co., P. O. Box 565, Pittsburgh, Pa.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Rockefeller Bldg., Cleveland 13, O.
American Sterilizer Co., Erie, Pa.
American Thermal Industries, 440 Illinois, Detroit 1, Mich.
American Thermometer Co., 2907 Clark Ave., St. Louis, Mo.
American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Welding & Mfg. Co., Griswold St., N. E., Warren, O.
American Well Wks., 100 N. Broadway, Aurora, Ill.
American Wheelabrator & Equipment Corp., 619 S. Byrkit St., Mishawaka, Ind.
American Zinc Products Co., Greencastle, Ind.
● Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Aminco Refrigeration Products Co., 14544 Third Ave., Detroit 3, Mich.
Ammco Tools, Inc., North Chicago, Ill.
Amp Corp., 2921 Locust St., St. Louis, Mo.
Ampex Electric Corp., 1155 Howard Ave., P. O. Box "AP," San Carlos, Calif.
Ampion Corp., 4-88 47th Ave., Long Island City 1, N. Y.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Andersen Corp., Bayport, Minn.
● Anderson Co., V. D., The, 1949 W. 96th St., Cleveland 2, O.
Anderson Diesel Engine Co., 6245 State Rd., Philadelphia 35, Pa.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
Anderson-Stolz Corp., 1731 Walnut St., Kansas City 8, Mo.
● Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anetsberger Bros., 3505 Elston Ave., Chicago, Ill.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anti-Friction Bearings Co., 2020 S. Figueroa St., Los Angeles 7, Calif.
Apex All Weather Products, Engineering Div., 228 N. La Salle St., Chicago 1, Ill.
● Apex Engineering Co., 75 E. Wacker Dr., Chicago 1, Ill.
Apollo Steel Co., 609 Warren Ave., Apollo, Pa.
Applied Mechanics Co., 167 Oliver St., Boston 10, Mass.
April Showers Co., Inc., 4126 Eighth St., N. W., Washington 11, D. C.
Aqua-Mist Co., 426 Jefferson St., Topeka, Kans.
Aqua-Sorb Co., 21 S. 16th St., East Orange, N. J.
Aquatic Chemical Laboratories, Inc., 95 Liberty St., New York 6, N. Y.
Arabol Mfg. Co., 110 E. 42nd St., New York 17, N. Y.
Arco Co., 7301 Bessemer Ave, Cleveland 4, O.
Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave., W., Seattle 99, Wash.
Arens Controls, Inc., 2267 S. Halsted St., Chicago, Ill.
Arex Co., 333 N. Michigan Ave., Chicago 1, Ill.
Arjac Products Inc., 55-59 Halstead St., Rochester 10, N. Y.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Armco Steel Corp., 461 Curtis St., Middletown, Ohio
Armour Ammonia Works, 1355 W. 31st St., Chicago, Ill.
Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago, Ill.
Armstrong Bros. Tool Co., 5200-5300 W. Armstrong Ave., Chicago 30, Ill.
Armstrong Co., The, Post Ave. and South St., Detroit 17, Mich.
Armstrong Control Co., Inc., P. O. Box 4637, Portland 2, Ore.
Armstrong Cork Co., 4400 Concord St., Lancaster, Pa.
● Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Armstrong Mfg. Co., 303 Knowlton St., Bridgeport 8, Conn.
Arrow-Hart & Hegeman Elect. Co., 103 Hawthorne St., Hartford 6, Conn.
Arrowhead Rubber Co., 2244 E. 37th St., Los Angeles 11, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Ashton Valve Co., 161-1st St., Cambridge 42, Mass.
Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.
Atkins & Co., E. C., 402 S. Illinois St., Indianapolis 9, Ind.
Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York, N. Y.
Atlantic Pipebending & Fabricating Corp., 552 River Rd., Edgewater, N. J.
Atlantic Steel Boiler Co., 24th St. and Brown St., Philadelphia 30, Pa.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlas Chemical Co., Marietta, O.
Atlas Powder Co., Industrial Finishes, North Chicago, Ill.
Atlas Utilities Co., Inc., 17 Exchange St., Providence 3, R. I.
Atlas Valve Co., Inc., 282 South St., Newark, N. J.
Atlas Welding Accessories Co., 14820 Wyoming Ave., Detroit 21, Mich.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Foundry Inc., Stoker Div., Auburn, Ind.
● Auer Register Co., 3608 Payne Ave., Cleveland 14, O.
Aurora Pump Co., 619 Loucks St., Aurora, Ill.
Austin-Mason Co., 15 Park Row, New York, N. Y.
● Autempco Corp., 521 Fifth Ave., New York 17, N. Y.
Autoforce Ventilating System, 244 Washington St., Boston 8, Mass.
Automatic Control Co., 1005 University Ave., St. Paul 4, Minn.
Automatic Devices Co., 53 W. Jackson Blvd., Chicago 4, Ill.
Automatic Electric Mfg. Co., 10 State St., Mankato, Minn.
Automatic Firing Corp., 6504 Olive Blvd., St. Louis 5, Mo.
Automatic Gas Equipment Co., 301 Brushton Ave., Pittsburgh 21, Pa.
● Automatic Products Co., 2460 N. 32nd St., Milwaukee 10, Wis.
Automatic Steel Products, Inc., Canton 6, O.
Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.
Automatic Temperature Control Co., Inc., 5212 Pulaski Ave., Philadelphia 44, Pa.
Autostributor Co., 238 Mill St., Lansing, Mich.
Azor Corp., 107 Montgomery Ave., Irvington, N. J.

B

B & B Tool & Specialty Co., The, 1704 Shafor Blvd., Dayton 9, O
B & M Mfg. Co., 19 N. Harrison St., East Orange, N. J.
B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.
Babbitt Chemical Specialties Co., 630 Fifth Ave., New York 20, N. Y
Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa
Bache, Semon & Co., Greenwich & Morton Sts., New York 14, N. Y.
Badger Fire Extinguisher Co., 624 Somerville Ave., Somerville 43, Mass
Badger & Sons Co., E. B., Cambridge Div., 260 Bent St., Cambridge 4 Mass.
Badham Insulation Co., Inc., Birmingham, Ala.
Baer Bros., 438 W. 37th St., New York 18, N. Y.
Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.
Bailey Co., Chas. M., 667 Folsum St., San Francisco 7, Calif.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.
● Baker Ice Machine Co., Inc., South Windham, Me.
● Baldor Electric Co., 4353 Duncan Ave., St Louis 10, Mo.
Baldwin Belting, Inc., 85 Chambers St., New York 7, N. Y.
Baldwin De La Vergne Sales Corp., Paschall P. O., Philadelphia, Pa
Baldwin-Hill Co., 531 Klagg Ave., Trenton 2, N. J.
Baldwin Locomotive Works, Eddystone Div., Eddystone, Pa.
Ball Welding Works, Inc., 10154 Edes Ave., Oakland 3, Calif.
Balloffet Dies and Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J
● Baltimore Aircoil Co., Inc., 715 - 17 W. Pratt St., Baltimore 1, Md
Bar-Brook Mfg. Co., Inc., 6133 Linwood Ave., Shreveport, La.
● Barber-Colman Co., 1228 Rock St., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14, O.
Barclay, Inc., Robert, 128 N. Peoria St., Chicago, Ill.
Barco Mfg. Co., Not Inc., 1801 Winnemac Ave., Chicago 40, Ill.
Bargar Sheet Metal Co., 12401 Euclid St., Cleveland, O.
● Barnes & Jones, Inc., 128 Brookside Ave., Jamaica Plain, Boston 3 Mass.
Barnes Manufacturing Co., Mansfield, O.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barrett Div., The, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., 912-916 Behan St., N. S., Pittsburgh 12, Pa.
Bart Mfg. Co., Inc., 227 Main St., Belleville 9, N. J.
Barth Mfg. Co., Milldale, Conn.
Bartlett Hayward, Div. of Koppers Co., 200 Scott St., Baltimore, Md.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Barton Co., 118 S. Eighth St., Minneapolis, Minn.
Barton Instrument Co., 3500 Union Pacific Ave., Los Angeles 23, Calif
Barwick Mfg. Co., 1020 E. Lincoln, Wichita, Kan.
Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, O.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bath Co., Cyril, The, E. 70th and Machinery Ave., Cleveland 8, O.
● Bauer & Black, Div. of the Kendall Co., 2500 S. Dearborn St., Chicago 16, Ill.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave., St. Louis 10, Mo.
Bayley Blower Co., 1817 S. 66th St., Milwaukee 14, Wis.
Beach-Russ Co., 64A Church St., New York, N. Y.
Beacon-Morris Corp., 60 Brainerd Rd., Allston, Boston 34, Mass.
● Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Bearings Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
Bearlee Products Co., 1255 S. Monroe, Green Bay, Wis.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6, Mo
Beckett & Co., Inc., Thomas, 2118 Griffin St., Dallas 2, Tex.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Belfield Co., H., 435 N. Broad St., Philadelphia 23, Pa.
Belknap Mfg. Co., 800 Union Ave., Bridgeport 1, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Belter Electric Mfg. Co., G. J., The, 3830-32 Olive St., St. Louis 8, Mo.
● Bendix Aviation Corp., Eclipse-Pioneer Div., Metal Hose Dept., Teterboro, N. J.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bennett Oil Co., 964 S. Saddle Creek Rd., Omaha 6, Neb.
Benson Co., Inc., Alex R., 1040 Bay Rd., So., Hudson, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.
Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O
Bern's Mfg. Co., 2778 Elston Ave., Chicago, Ill.
Bernz Co., Otto, 280 Lyell Ave., Rochester 6, N. Y.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.

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Best Combustion Equipment Co., Inc., W. N., 90 West St., New York, N. Y.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Bethlehem Foundry & Machine Co., W. Second St., Bethlehem, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Betz Corp., 460 State St., Hammond, Ind.
Beverly Shear Mfg. Co., 3013 W. 110th Pl., Chicago 43, Ill.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12, Wis.
Bigelow Co., 174 River St., New Haven 3, Conn.
Biggs Boiler Wks. Co., The, Case Ave. and B. & O. R. R., E. Akron 5, O.
Bignall & Keeler Div., John Ramming Machine Co., 4591 McRee Ave., St. Louis 10, Mo.
Billings & Spencer Co., 1 Laurel St., Hartford 1, Conn.
Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
● Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
● Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.
Black Magic Products Co., P. O. Box 1703, Tulsa, Okla.
Black Mfg. Co., The, 1426 W. Baltimore St., Baltimore 23, Md.
Black-Sivalls & Bryson, Inc., 7501 E. 10th St., Kansas City 3, Mo.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis.
Blackmer Pump Co., 1920A Century Ave., S. W., Grand Rapids 9, Mich.
Blaisdell Compressor Co., 227 Fulton St., New York, N. Y.
Blazer, M., & Son, 173 Market St., Passaic, N. J.
Bliss Co., E. W., 450 Amsterdam Ave., Detroit 2, Mich.
Blocksom & Co., E. 5th St., Michigan City, Ind.
Blood Brothers Machine Co., Div. of Standard Steel Spring Co., Allegan, Mich.
Blower Application Co., 3165 N. 30th St., Milwaukee 10, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W. Roselle Park, N. J.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Bogue Electric Co., 37 Kentucky Ave., Paterson 3, N. J.
Bohn Aluminum & Brass Corp., 2306 Franklin St., Detroit, Mich.
Boiler Room Equipment Inc., 381 Fourth Ave., New York 16, N. Y.
Bonafide Genasco, Inc, 295 Fifth Ave., New York 16, N. Y.
Bonney Forge & Tool Wks., 350 Green St., Allentown, Pa.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borg-Erickson Corp., 469 E. Ohio St., Chicago 11, Ill.
Borm Mfg. Co., 23 N. Union St., Elgin, Ill.
Boston Auto Gage Co., 70 West St., Pittsfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Boston Woven Hose & Rubber Co., 29 Hampshire St., Cambridge, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bowen Engineering, Inc., Garwood, N. J.
Bowser, Inc., 1302 E. Creighton Ave., Fort Wayne 2, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Breidert Co., G. C., 3129 San Fernando Rd., Los Angeles 41, Calif.
Bremil Mfg. Co., 1204 Pittsburgh Ave., Erie, Pa.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Connecticut Ave., Bridgeport 1, Conn.
Bristol Co., The, P. O. Box 1790, Waterbury 91, Conn.
Broan Mfg. Co., Inc., 1669 N. Water St., Milwaukee 2, Wis.
Brockway Co., 361 Church St., Naugatuck, Conn.
Bronson Fan Mfg. Co., 1237 Riverside Dr., Los Angeles 31, Calif.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, 2 Porter St., Stoughton, Mass.
Brooklyn Varnish Mfg. Co., 50 Jay St., Brooklyn 1, N. Y.
Brooks Equipment Corp., 217 Hudson St., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., 1057 Tenth Ave., S. E., Minneapolis 14, Minn.
Brown-Brockmeyer Co., Inc., P. O. Box 976, Dayton 1, O.
Brown Co., 500 Fifth Ave., New York, N. Y.
Brown Electric Co., 96-08 72nd Ave., Forest Hills, N. Y.
● Brown-Electro Co., 17 N. Dewey, Oklahoma City 2, Okla.
Brown Fintube Co., The, Elyria, O.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa.
● Brownell Co., 408 N. Findlay St., Dayton 1, O.
Browning Mfg. Co., Inc., 1940 Browning Blvd., Maysville, Ky.
Brundage Co., The, 500-514 N. Park St., Kalamazoo 11, Mich.
Bruning Co., Inc., Charles, 4754 Montrose Ave., Chicago 41, Ill.
Brunner Mfg. Co., 1821 E. Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Corp., C. L., 4610 St. Clair Ave., Cleveland 3, O.
Bryant Heater Co., 17825 St. Clair Ave., Cleveland 10, O.
Bubar, Hudson H., Old Lyme, Conn.
Buckeye Tools Corp., 29 W. Apple St., Dayton 1, O.
Buda Co., Harvey, Ill.
Buffalo Bolt Co., North Tonawanda, N. Y.
● Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
● Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., Dunellen, N. J., Buffalo, N. Y.
Buflovac Equipment Div. of Blaw-Knox Co., 50 Winchester Ave., Buffalo 11, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, 9 Codding St., Providence 1, R. I.
Bullard Co., The, 286 Canfield Ave., Bridgeport 2, Conn.
Bump Pump Co., La Crosse, Wis.
● Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Burden Co., 1000 N. Orange Dr., Los Angeles 38, Calif.
Burke Electric Co., 1201 W. 12th St., Erie, Pa.
Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago, Ill.
Burling Instrument Co., Air Conditioning Div., 253 Springfield Ave., Newark 3, N. J.
Burnham Corp., Boiler Div., Main St., Irvington, N. Y.
Burnley Battery & Mfg. Co., Clay St., North East, Pa.
Burrows Mfg. Co., F. A., 318 E. Poplar St., York, Pa.
Burt Mfg. Co., 41 E. South St., Akron 11, O.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
● Bush Mfg. Co., 179 South St., West Hartford, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa.

C

C-B Tool Co., Wabank Rd., Lancaster, Pa.
CCA Products, Inc., P. O. Box 671, Glendale 5, Calif.
C & H Air Conditioning Fan Co., Inc., 1603 DeKalb Ave., N. E., Atlanta 6, Ga.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25, Pa.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
Caloroil Burner Corp., 1477 Park St., Hartford, Conn.
Camloc Fastener Corp., 420 Lexington Ave., New York 17, N. Y.
Campbell Co., J. A., 645 E. Wardlaw Rd., Long Beach 7, Calif.
Campbell Engineering Co., 918 N. Union St., Appleton, Wis.
● Campbell Heating Co., 31st & Dean, P. O. Box 833, Des Moines 4, Ia.
Campbell Heating Co., E. K., 1606 Main St., Kansas City 8, Mo.
Cam-Stat, Inc., Div. of The Paul Henry Co., 2310 S. LaCienega Blvd., Los Angeles 34, Calif.
Canatsey Electric Mfg. Co., Box 556, Kansas City 8, Mo.
Cannelton Sewer Pipe Co., RadianTile Div., 120 S. LaSalle St., Chicago 3, Ill.
Cannon Chemical Co., Inc., 210 Broadway, Everett 49, Mass.
Canton Stoker Corp., 407 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 1236 S. 7th St., St. Louis 4, Mo.
Capitol Mfg. & Supply Co., 153 W. Fulton St., Columbus, O.
Carbide and Carbon Chemicals Corp., 30 E. 42nd St., New York 17, N. Y.
Carey Mfg. Co., Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 15 Park Row, New York 7, N. Y.
Carlin Co., Anthony, 2717 E. 75th St., Cleveland, O.
Carling Turbine Blower Co., 25 St. John's Rd., Worcester 3, Mass.
● Carnegie-Illinois Steel Corp., United States Steel Corp. Subsidiary, Carnegie Bldg., Pittsburgh 30, Pa.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carney Co., Inc., The, Mankato, Minn.
Carolina Aniline & Extract Co., 301 S. Cedar St., Charlotte 1, N. C.
Carpenter Heating & Stoker Co., 2135 St. Clair Ave., Cleveland 14, O.
Carpenter Mfg. Corp., The, 9523 Detroit Ave., Cleveland 2, O.
Carpenter & Paterson, Inc., 1190 Bennington St., East Boston 28, Mass.
● Carrier Corp., 302 S. Geddes St., Syracuse 1, N. Y.
Carty & Moore Engineering Co., 511 W. Larned St., Detroit 26, Mich.
Carver Pump Co., Muscatine, Ia.
Case & Son Mfg. Co., W. A., 33 Main St., Buffalo 3, N. Y.
● Cash Co., A. W., P. O. Box 551, Decatur, Ill.
Cash Valve Mfg. Co., A. W., 6621 E. Wabash Ave., Decatur 80, Ill.
Cashin Co., W. D., 69 A. St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Caterpillar Tractor Co., 600 W. Washington St., Peoria, Ill.
Caton Co., 972 Broad St., Newark 2, N. J.
Catskill Metal Works, Inc., Catskill, N. Y.
Celco Corp., Dept. 101, 110 E. 42nd St., New York 17, N. Y.
Celotex Corp., The, 120 S. La Salle Bldg., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Brass Mfg. Co., 2950 E. 55th St., Cleveland 4, O.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., 386 Fourth Ave., New York 16, N. Y.
Central Rubber & Steel Corp., P. O. Box 420, Findlay, O.
Central States Mfg. Co., Inc., 1200-12 Summit St., Arkansas City, Kan.
Central States Steel Boiler Co., 4649 W. Harrison St., Chicago 44, Ill.
Central Station Steam Co., 2920 E. Woodbridge St., Detroit 7, Mich.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Centrifix Corp., 3029 Prospect Ave., Cleveland 15, O.
Centri-Spray Corp., 14290 Meyers Rd., Detroit 27, Mich.
Century Aircraft Co., 5601 W. Century Blvd., Inglewood, Calif.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Century Engineering Co., 5529 S. Vermont Ave., Los Angeles 37, Calif.
Century Engineering Corp., 401-431 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 45 Cedar St., Stamford, Conn.
Certain-teed Products Corp., 120 E. Lancaster Ave., Ardmore, Pa.
Certified Flexible Couplings, 369 Lexington Ave., New York 17, N. Y.
Certified Furnace Co., Div. Stainless & Steel Products Co., 1000 Berry Ave., St. Paul 4, Minn.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 1617 W. Bruce, Milwaukee 4, Wis.
Chamberlin Co. of America, 1254 La Brosse St., Detroit 26, Mich.
Champion Blower & Forge Co., Harrisburg Ave. and Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 215 Eaton St., Peoria 3, Ill.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Champion Unit Heater Co., 3535 Fillmore St., Chicago 24, Ill.
Chandler Co., 804 First Ave., N. W., Cedar Rapids, Ia.
Chaplin-Fulton Mfg. Co., 28-40 Penn Ave., Pittsburgh, Pa.

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Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Char-Gale Mfg. Co., 4325 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.
Chase-Shawmut Co., Newburyport, Mass.
Chelsea Fan & Blower Co., Inc., 1206 S. Grove St., Irvington 11, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Cheney Flashing Co., 623 Prospect St., Trenton 5, N. J.
Chicago Belting Co., 113-125 N. Green St., Chicago 7, Ill.
Chicago Blower Corp., 4558 W. Congress St., Chicago 24, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 1338 W. Concord Pl., Chicago 22, Ill.
Chicago Fan & Fin Coil Co., 1937 Walnut St., Chicago 12, Ill.
Chicago Filter Co., Joliet, Ill.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago 22, Ill.
Chicago Float Works, Inc., Dept. T., 2330 S. Western Ave., Chicago 8, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.
● Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.
Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 1616 S. Laramie Ave., Cicero 50, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
● Chicago Pump Co., 2323 Wolfram St., Chicago 18, Ill.
Chicago Seal Co., 20 N. Wacker Dr., Chicago 6, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Tank Co., 6400 W. 66th, Chicago 38, Ill.
Chicago-Wilcox Mfg. Co., E. 77th St. and Anthony Ave., Chicago, Ill.
Chiksan Co., Brea, Calif.
Chisholm Co., Allen E., 2640 E. Burnside St., Portland, Ore.
Cincinnati Electrical Tool Co., The, 2684 Madison Rd., Cincinnati 8, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Cinder Products Corp., 75 Ellenfield St., Providence, R. I.
Circulators & Devices Mfg. Corp., 22 Rose St., New York, N. Y.
Cissell Mfg. Co., Inc., W. M., 831 S. First St., P. O. Box 1143, Louisville 1, Ky.
● Clarage Fan Co., Porter St., Kalamazoo 16, Mich.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, O.
Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
Clark Electric Co., 903 S. Third St., Memphis, Tenn.
Clark Electric Co., Jas., Jr., 615 Bergman St., Louisville 3, Ky.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Claronex Products, Inc., 239 Java St., Brooklyn, N. Y.
Clay Equipment Corp., Cedar Falls, Ia.
Clayton & Lambert Mfg. Co., 1701 Dixie Hwy., Louisville 10, Ky.
Clayton Mfg. Co., P. O. Box 550, El Monte, Calif.
● Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.
Cleghorn Co., 86 Broad St., Boston, Mass.
Cleveland Brass Mfg. Co., The, 4606 Hamilton Ave., Cleveland, O.
Cleveland Fuel Equipment Co., 1901 Train Ave., Cleveland 13, O.
Cleveland Graphite Bronze Co., 17000 St. Clair Ave., Cleveland 10, O.
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
Cleveland Tramrail Div., Cleveland Crane & Eng. Co., 5866 E. 283rd St., Wickliffe, O.
Clifford Mfg. Co., 564 E. First St., Boston, Mass.
Climax Machinery Co., Indianapolis, Ind.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clow & Sons, James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cochrane Corp., 3131 N. 17th St., Philadelphia 32, Pa.
Cobra Pipe & Coil Co., Inc., Brook St., P. O. Box 176, Elmwood 10, Conn.
Coe Mfg. Co., Bank St., Painesville, O.
Cole-Sewell Engineering Co., 2288 University Ave., St. Paul 4, Minn.
Colebrook & Sons, Inc., W. H., 246 Walton St., Syracuse, N. Y.
Coleman-Pettersen Corp., 2130 St. Clair Ave., Cleveland 14, O.
Colonial Alloys Co., Metals Div., Ridge Ave. and Crawford St., Philadelphia 29, Pa.
Columbia Radiator Co., 3400 Walnut St., McKeesport, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco 6, Calif.
Columbian Steel Tank Co., 1509 W. 12th St., Kansas City 7, Mo.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus 16, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
● Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.
Combustion Engineering Co., Inc., 200 Madison Ave., New York 16, N. Y.
Combustion Systems Div., Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.
● Comfort Products Corp., 2220 Lamesa, Dallas 2, Tex.
Commercial Filters Corp., 18 W. Third, Boston 27, Mass.
Commercial Plastics Co., 1198 Merchandise Mart, Chicago 54, Ill.
Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8, Mich.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18, Ill.
Congress Drives Div., Tann Corp., 3750 E. Outer Drive, Detroit 12, Mich.
Congress Fan & Electric Co., P. O. Box 3747, Peninsula Sta., Daytona Beach, Fla.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Connery Construction Co., 2nd and Luzerne Sts., Philadelphia 40, Pa.
● Connor Engineering Corp., W. B., 112 E. 32nd St., New York 16, N. Y.
Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
● Continental Air Filters, Inc., 2520 Helm St., Louisville 1, Ky.
Continental Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machine Co., 1952-54 Maud Ave., Chicago, Ill.
Continental Motors Corp., Muskegon 82, Mich.
Continental Products Co., 1150 E. 22nd St., Euclid 17, O.
Continental Radiant Glass Heat Corp., 521 Fifth Ave., New York 15, N. Y.
Continental Rubber Wks., 2000 Liberty St., Erie, Pa.
Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Controldtemp Equipment Sales Corp., 236 Butler St., Brooklyn 17, N. Y.
Cook, Inc., A. D., Lawrenceburg, Ind.
Cook Electric Co., Diaphlex Div., 2700 Southport Ave., Chicago 14, Ill.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
Copeland Refrigeration Corp., Sidney, O.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Coral Designs, P. O. Box 248, Forest Hills, N. Y.
Corbman Bros., Inc., 315 N. 7th St., Philadelphia 6, Pa.
Cordo Chemical Co., 34 Smith St., Norwalk, Conn.
Cork Import Corp., 39 Park Pl., Englewood, N. J.
Cork Insulation Co., Inc., 155 E. 44th St., New York, N. Y.
Corley Co., Inc., The, One Exchange Place, Jersey City 2, N. J.
Corning Glass Works, Corning, N. Y.
Coroaire Heater Corp., The, 1124 Hanna Bldg., Cleveland 15, O.
Coughlan Co., G. N., West Orange, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
● Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 1872 Cuyler Ave., Chicago 13, Ill.
CraneVeyor Corp., 1240 S. Boyle Ave., Los Angeles 23, Calif.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crise Mfg. Co., The, 2040 E. Main, Columbus, O.
Crittall Radiant Heating, Inc., Richard, 665 Fifth Ave., New York 22, N. Y.
Crocker-Wheeler Electric Mfg. Co., Div. Joshua Hendy Iron Works, Ampere 14, N. J.
Croll-Reynolds Engineering Co., Inc., 17 Johns St., New York 7, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa.
Cronholm Mfg. Co., 3500 S.E. Hawthorne Ave., Portland 15, Ore.
Crotty Mfg. Co., 133-15 35th Ave., Flushing, L. I., N. Y.
Crown Controls Co., Inc., New Bremen, O.
Crown Die & Tool Co., 108 N. Jefferson St., Chicago 6, Ill.
Crown Iron Works Co., 1202 N. E. Tyler, Minneapolis, Minn.
Crozier Machine Tool Co., 684 N. Prairie Ave., Hawthorne, Calif.
Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.
Cryer Trap & Valve Co., Inc., 366 Madison Ave., New York 17, N. Y.
Cuno Engineering Corp., 80 S. Vine St., Meriden, Conn.
Curtis Automotive Devices, Inc., 8 Norwood Ave., Dayton 7, O.
Curtis & Curtis Co., The, 450 Garden St., Bridgeport, Conn.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., 1950 Kienlen Ave., St. Louis 20, Mo.
Custom Engineering Co., 3138 W. Slauson Ave., Los Angeles 43, Calif.
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.
Cyclotherm Corp., 90 Broad St., New York 4, N. Y.

D

Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., 628 Somerville Ave., Somerville 43, Mass.
Dahlstrom Machine Works, 4970 N. Elston Ave., Chicago 30, Ill.
Daigger & Co., A., 161 W. Kinzie St., Chicago, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Dalzen Tool & Mfg. Co., 13650 E. Ten Mile Rd., Detroit 5, Mich.
Dampney Co. of America, 1243 River St., Hyde Park, Boston 36, Mass.
Dana Fan & Blower Corp., 3501-27 Colerain Ave., Cincinnati 23, Ohio
Danzer Metal Works Co., Box 201, Hagerstown, Md.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Dart Mfg. Co., E. M., 134 Thurbers Ave., Providence 5, R. I.
DAS Div. of, Defiance Automatic Screw Co., Defiance, O.
Davey Compressor Co., Kent, O.
Davidson Co., M. T., 43-53 Keap St., Brooklyn 11, N. Y.
Davidson Hy Duty Roof Fan Co., 213 California St., Newton, Mass.
Davies & Co., Wayne, Westboro, Mass.
Davis & Co., Inc., Dean W., 1006 First St., Kentland, Ind.
Davis Emergency Equipment Co., 83 Halleck St., Newark 4, N. J.
Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Davison Chemical Corp., The, 20 Hopkins Pl., Baltimore 3, Md.
Day & Night Mfg. Co., Refrigeration Div., 710 Duarte Ave., Monrovia, Calif.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Dayton Air Compressor Co., Dayton, O.
● Dayton Rubber Co., 2342 W. Riverview Ave., Dayton 1, O.
● Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Dearborn Chemical Co., 310 S. Michigan Ave., Chicago 4, Ill.

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Debevoise Co., The, 968 Grand St., Brooklyn 6, N. Y.
● DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Dr., Decatur 70, Ill.
Defender Instrument & Regulator Co., 815 Clark Ave., St. Louis 2, Mo.
De Laval Steam Turbine Co., Trenton 2, N. J.
Delavan Engineering Co., 414-12th St., Des Moines 9, Ia.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta-Star Electric Co., 2400 Block, W. Fulton St., Chicago, Ill.
Deming Co., 14 Aetna St., Salem, O.
Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desolvo Co., The, 719 Foreland St., Pittsburgh 12, Pa.
Despatch Oven Co., 619 S. E. Eighth St., Minneapolis 14, Minn.
d'Este Div., Kaye & MacDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Detroit Brass & Malleable Works, 100 S. Campbell, Detroit 9, Mich.
Detroit Diesel Engine Co., General Motors Corp., 13400 W. Outer Dr., Detroit 23, Mich.
Detroit Lubricator Co., 5900 Trumbull Ave., Detroit 8, Mich.
Detroit Seamless Steel Tubes Co., c/o Grand River Station, Box A, Detroit 8, Mich.
Detroit Stamping Co., 337 Midland Ave., Detroit 3, Mich.
Detroit Stoker Co., Fifth Floor, General Motors Bldg., Detroit 2, Mich.
Devices, Inc., 280 Madison Ave., New York, N. Y.
DeVilbiss Co., The, 300 Phillips Ave., Toledo 1, O.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., 1932 Oliver Bldg., Pittsburgh 22, Pa.
Devoe & Raynolds Co., Inc., 44th St. and 1st Ave., New York 17, N. Y.
Dewey Shepard Boiler Co., Peru, Ind.
Dial Light Co. of America, Inc., 900 Broadway, New York 3, N. Y.
Diamond Chain & Mfg. Co., 438 Kentucky Ave., Indianapolis 7, Ind.
Diamond Chemical Products, 17 E. 48th St., New York, N. Y.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Iron Works, Inc., 1728 Second St. N., Minneapolis 11, Minn.
Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 288, Detroit 31, Mich.
Diceler Div. of General Machine & Mfg. Co., Blair St. and Spring Garden Ave., Berwick, Pa.
Dick Co., Inc. R. & J., 24-48 Sade St., Passaic, N. J.
Dickinson, Aeolus, 3320 S. Artesian Ave., Chicago, Ill.
Diehl Mfg. Co., Finderne Plant, 1106 Finderne Ave., Somerville, N. J.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon Co., Inc., W. C., 5410 W. Harrison St., Chicago 44, Ill.
Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Division Lead Co., 836 W. Kinzie St., Chicago 22, Ill.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City, N. J.
Doall Co., The, 254 N. Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 1128 Munsey Bldg., Washington 4, D. C.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
● Dole Valve Co., The, 1933 Carroll Ave., Chicago 12, Ill.
● Dollinger Corp., 9 Centre Park, Rochester 3, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
Douglas Automatic Controls Co., 4505 Firestone Blvd., South Gate, Calif.
Dover Metal Products Co., The, Canal Fulton, O.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dowell Inc., 524 Kennedy Bldg., Tulsa 3, Okla.
Downingtown Iron Works, Wallace Ave., Downingtown, Pa.
Doyle & Roth Mfg. Co., 10-15 49th Ave., Long Island City, N. Y.
● Dravo Corp., Machinery Div., Dravo Bldg., Pittsburgh 22, Pa.
Drayer & Hanson, Inc., 3301 Medford Ave., Los Angeles 33, Calif.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dreis Co., Ltd., Edward J., 841 County Rd., San Carlos, Calif.
Dresser Mfg. Div., Dresser Industries, Inc., 490 Fisher Ave., Bradford, Pa.
Drico Industrial Corp., 29 Broadway, New York 6, N. Y.
Drinkwater, Inc., Spring & Madison St., Waukegan, Ill.
Dry Air Products Corp., 734 Jackson Place, Washington 6, D. C.
Drying Systems, Inc., 1812¾ W. Foster Ave., Chicago 40, Ill.
Dryomatic Corp. of America, 17 E. 22nd St., Baltimore 18, Md.
Dry-Zero Corp., Merchandise Mart, Chicago 54, Ill.
Dual-Air Fan Co., P. O. Box 169, South Elgin, Ill.
Dudgeon, Inc., Richard, Columbia and Broome Sts., New York 2, N. Y.
Duffy Engineering Co., 20 S. E. 9th Ave., Portland 14, Ore.
● Dunham Co., C. A., 400 W. Madison St., Chicago 6, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
du Pont de Nemours & Co., E. I., Ammonia Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Fabrics & Finishes Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
● Durant Insulated Pipe Co., 1015 Runnymede St., P. O. Box 88, Palo Alto, Calif.
Duriron Co., Inc., The, 450 N. Findlay St., Dayton 1, O.
Duro Co., 537 Monument Ave., Dayton, O.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dust Filter Co., 4418 N. Clark St., Chicago 40, Ill.
Dust Suppression & Engineering Co., 154 Grove St., Lake Orion, Mich.
Dustlix Corp., 715 N. Van Buren St., Milwaukee, Wis.
Dutton Co., C. H., Portage & Gibson Sts., Kalamazoo 6, Mich.
Dwyer Mfg. Co., F. W., 317 S. Western Ave., Chicago 12, Ill.
Dynamic Air Engineering, Inc., 1619 S. Alameda, Los Angeles 21, Calif.
Dzus Fastener Co., Inc., P. O. Box 785, Babylon, N. Y.

E

● Eagan Co., Walter H., 2336-38 Fairmount Ave., Philadelphia 30, Pa.
Eagle-Picher Co., American Bldg., Cincinnati 1, O.
Eaglesfield Ventilator Co., 910-20 Dorman St., Indianapolis, Ind.
Eastern Air Devices, Inc., 130 Flatbush Ave., Brooklyn 17, N. Y.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Eastern Industries Inc., 396 Elm St., New Haven 6, Conn.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Kodak Co., Kodak Park, Rochester 4, N. Y.
Eckhart Mfg. Co., 470 First Ave., West, Roselle, N. J.
Eclipse Air Brush Co., Inc., 381 Park Ave., Newark, N. J.
Eclipse Fuel Engineering Co., 707 S. Main St., Rockford, Ill.
Econocol Stoker Div. of Cotta Transmission Co., 2340 11th St., Rockford, Ill.
Economy Equipment Co., 919 W. 49th Pl., Chicago 9, Ill.
● Economy Pumps, Inc., 1000 Weller Ave., Hamilton, O.
Economy Valve Seat Co., 3122 N. California Ave., Chicago 18, Ill.
Eddy Stoker Corp., 4717 W. North Ave., Chicago 39, Ill.
Eddy Valve Co., Waterford, N. Y.
Edge Moor Iron Wks., Inc., Edge Moor 25, Del.
Edison, Inc., Thomas A., Instrument Div., Lakeside Ave., West Orange, N. J.
Edward Valves, Inc. 1200 W. 145th St., East Chicago, Ind.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eiker Mfg. Co., Ogallala, Neb.
Eisler Engineering Corp., 754 S. 13th St., Newark 3, N. J.
Elastic Porcelain Lining Corp., 42 East Ave., Rochester 4, N. Y.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
● Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
Electradiant Corp., 500 Del Monte Ave., Monterey, Calif.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo 1, O.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, O.
Electric Cord Co., 30 Church St., New York 7, N. Y.
Electric Machinery Mfg. Co., 821 Second Ave., S. E., Minneapolis 14, Minn.
Electric Sprayit Co., The, 1415-25 Illinois Ave., Sheboygan, Wis.
Electric Steel Foundry Co., 2141 N. W. 25th St., Portland, Ore.
Electrimatic, 2100 Indiana Ave., Chicago 16, Ill.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Electro Products Laboratories, Inc., 549 W. Randolph St., Chicago, Ill.
Electrol Burner Mfg. Co., Inc., 22 Union Ave., Rutherford, N. J.
Electrol, Inc., 85 Grand St., Kingston, N. Y.
Electromode Corp., 45 Crouch St., Rochester 3, N. Y.
Electro-Switch & Controls Inc., 8568 W. Washington Blvd., Culver City, Calif.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 2738 W. Warren Ave., Detroit 8, Mich.
Elliott Co., Jeannette, Pa.
Ellis Drier Co., 2444 N. Crawford Ave., Chicago 39, Ill.
Ellison Draft Gage Co., 214 W. Kinzie St., Chicago 10, Ill.
Ellsworth Pipe & Supply Co., 513 W. Traser St., Milwaukee 3, Wis.
Elraco Engineering Co., 732 W. 58th St., Los Angeles 37, Calif.
Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 21, Mo.
Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City 1, N. Y.
Endura Mfg. Corp., 45 N. 4th St., Quakerstown, Pa.
Engelhard, Inc., Charles, 900 Passaic Ave., East Newark, N. J.
Engineer Co., 75 West St., New York 6, N. Y.
● Enterprise Engine & Foundry Co., 18th & Florida Sts., San Francisco 10, Calif.
Equipoise Controls, 100 Stevens Ave., Mount Vernon, N. Y.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erickson Specialty Co., 10 Cayuga St., P. O. Box 141, Cohoes, N. Y.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 11th & French Sts., Erie 2, Pa.
Ernst Water Column & Gage Co., 250 Livingston Ave., Livingston, N. J.
Ess Instrument Co., 96 Washington Ave., Bergenfield, N. J.
Ess Specialty Corp., 96 S. Washington Ave., Bergenfield, N. J.
Essex Wire Corp., Div. of., 37 Manchester Ave., Detroit, Mich.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.
Even-Ray Co., Inc., 93 Tiffany Blvd., Newark 4, N. J.
Everhot Products Co., 2059 W. Carroll, Chicago 12, Ill.
Everite Pump & Mfg. Co., Inc., P. O. Box 1391, Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Ewing Mfg. Co., 2545 N.W. 10th, Oklahoma City 7, Okla.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 118 S. Clinton St., Chicago 6, Ill.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.
E-Zee Tool Mfg. Corp., 136 Liberty St., New York 6, N. Y.

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F

FASCO Industries, Inc., P. O. Box 509, Rochester 2, N. Y.
Faber Engineering Co., Amber & Westmoreland Sts., Philadelphia, Pa.
Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
Fairbanks Co., 393 Lafayette St., New York 3, N. Y.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falk Corp., 3010 W. Canal St., Milwaukee 8, Wis.
Falstrom Co., 26 Falstrom Court, Passaic, N. J.
Famco Machine Co., 1314 18th St., Racine, Wis.
Farley Sleeve & Hanger Co., 3748 E. 71st St., Cleveland, O.
Farquhar Co., A. B., 142 N. Duke St., York, Pa.
Farr Co., 2615 Southwest Dr., Los Angeles 43, Calif.
Farrar & Trefts, 20 Milburn St., Buffalo 12, N. Y.
Farris Engineering Corp., 400 Commercial Ave., Palisades Park, N. J.
● Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7, N. Y.
Federal Boiler Co., Inc., Granite & West Sts., Midland Park, N. J.
Federal Machine & Welder Co., The, Griswold St., Warren O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Fee and Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47, Ill.
Felt Products Mfg. Co., 1504 Carroll Ave., Chicago 7, Ill.
Felters Company, The, 210 South St., Boston 11, Mass.
Fenwal, Inc., 200 Pleasant St., Ashland, Mass.
Ferguson & Lange Foundry Co., 1039 Willows St., Chicago, Ill.
Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
Ferro-Nil Corp., 381 Fourth Ave., New York 16, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Filtair Mfg. Co., 487 S. Van Ness Ave., San Francisco 3, Calif.
Filtrine Mfg. Co., Inc., 53A Lexington Ave., Brooklyn 5, N. Y.
Fingles Co., The, Reistertown Rd. at Elgin Ave., Baltimore 17, Md.
Finn & Co., 2850 8th Ave., New York 30, N. Y.
Finn Engineers, Jerry, 201 N. First National Bank Bldg., St. Paul 1, Minn.
Fintube Coil Corp., 19 W. Main St., Alhambra, Calif.
Fire-King Stoker Co., 3760 E. St. Clair, Indianapolis, Ind.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago 14, Ill.
Firemood Machine Wks., Converse, Ind.
Firestone Industrial Products, 1200 Firestone Pkwy., Akron 17, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fischer & Porter Co., 600 County Line Rd., Hatboro, Pa.
Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.
Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.
Fitch, Allen & Co., 1131 Bryn Mawr Ave., Chicago 40, Ill.
● Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
Flagg & Co., Inc., Stanley G., 1421 Chestnut St., Philadelphia 2, Pa.
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.
Flexible Tubing Corp., Branford, Conn.
Flexitallic Gasket Co., 8th & Bailey Sts., Camden, N. J.
Flexlock Corp., 411 E. Market St., Akron, O.
Flexo Supply Co., Inc., 4649 Page Blvd., St. Louis 13, Mo.
Flintkote Co., The, 30 Rockefeller Plaza, New York 20, N. Y.
Flori Pipe Co., The, 601 E. Red Bud Ave., St. Louis 15, Mo.
Floridin Co., Warren, Pa.
Flotrol Systems, Inc., 817 N. Lewis Pl., Tulsa, Okla.
Fluid Heat Div., Anchor Post Products, Inc., 6500 Eastern Ave., Baltimore 24, Md.
Fluid Systems, Inc., 1881 Dixwell Ave., New Haven, Conn.
Fluor Corp., Ltd., The, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Follansbee Steel Corp., 3rd and Liberty Aves., Pittsburgh, Pa.
Forty-Eight Insulations, Inc., N. Aurora St., Aurora, Ill.
Fossum, M. H., 2086 Marshall Ave., St. Paul, Minn.
Foster Engineering Co., 109 Monroe St., Newark, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.
Fowler & Wolfe Radiator Co., Oak and Carson Sts., Norristown, Pa.
Fox Control & Mfg. Co., 3589 E. 93rd St., Cleveland, O.
Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
Fram Corp., Providence 16, R. I.
France Packing Co., 6512 Tacony St., Tacony, Philadelphia 35, Pa.
Franklin Electric Co., Inc., Bluffton, Ind.
Frederick Iron & Steel Co., E. 7th St., Frederick, Md.
Freed Products Co., 1510 Third Ave., Moline, Ill.
Freeman Stoker Div., Illinois Iron & Bolt Co., 914 S. Michigan Ave., Chicago 5, Ill.
Fresh'nd-Aire Co., Div. of Cory Corp., 221 N. LaSalle St., Chicago 1, Ill.
Fretz-Moon Tube Co., Inc., Butler, Pa.
● Frick Co., Waynesboro, Pa.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson, Baltimore 4, Md.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frost Mfg. Co., S. Henderson St., Galesburg, Ill.
Fuel Savers, Inc., 15th and Herr Sts., Harrisburg, Pa.
Fuelguard Co., 2826 Fondren Dr., Dallas 5, Tex.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Fuller Co., 124 Bridge St., Catasauqua, Pa.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Box 400, Knoxville 4, Tenn.
Furst Electronics, 800 W. North Ave., Chicago 22, Ill.

G

G. D. S. Machinery & Supply Co., Inc., 101 Walker St., New York, N. Y.
G. M. Mfg. Co., 50 W. 3rd St., New York 12, N. Y.
● G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
Gallaher Co., The, Owatonna, Minn.
Galv-Weld Products, P. O. Box 37, Sta. D, Dayton 10, O.
Garden City Fan Co., 332 S. Michigan Ave., Chicago 4, Ill.
Garden City Instruments, Inc., 608 S. Dearborn St., Chicago 5, Ill.
Gardiner Metal Co., 2514 W. 48th Pl., Chicago 32, Ill.
● Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., 50 Main St., Palmyra, N. Y.
Gas & Oil Industry Laboratories, Inc., 4 Paine Ave., Irvington, N. J.
Gasflux Co., Mansfield, O.
Gates Engineering Co., P. O. Box 1711, Wilmington, Del.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gatke Corp., 228 N. LaSalle St., Chicago, Ill.
Gehri Co., 1117 Tacoma Ave., Tacoma 3, Wash.
● General Blower Co., 8610 Ferris Ave., Morton Grove, Ill.
General Blower Co., Inc., 6137 Market St., Philadelphia 39, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
● General Controls Co., 801 Allen Ave., Glendale 1, Calif.
General Corporation, 3353 University Ave., Minneapolis 14, Minn.
General Die and Stamping Co., 262-272 Mott St., New York 12, N. Y.
General Electric Co., Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.
● General Electric Co., Apparatus Dept., 1 River Rd., Schenectady 5, N. Y.
General Electric Co., Chemical Dept., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, O.
General Engineering & Mfg. Co., 4417 Oleatha St., St. Louis 16, Mo.
General Filters, Inc., 12890 Westwood, Detroit 23, Mich.
● General Fittings Co., 123 Georgia Ave., Providence 5, R. I.
● General Gas Light Co., 212 N. Park, Kalamazoo 11F, Mich.
General Insulating Products Co., 8821 15th Ave., Brooklyn, N. Y.
General Machinery Co., 3500 Riverside Ave., Spokane 1, Wash.
General Ozone Corp., 1455 W. Congress St., Chicago 7, Ill.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Power Plant Corp., 381-4th Ave., New York 16, N. Y.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.
Genspring, Inc., 500 Fifth Ave., New York 18, N. Y.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Gerstein & Cooper Co., 624 Somerville Ave., Somerville, Mass.
Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th St., Milwaukee, Wis.
Giannini & Co., Inc., G. M., 285 W. Colorado, Pasadena 1, Calif.
Giant Mfg. Co., South Ave., Council Bluffs, Ia.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilbert Brass Foundry Co., 5028 Farlin St., St. Louis, Mo.
Gilmer Company, L. H., Div. of United States Rubber Co., Tacony, Philadelphia 35, Pa.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 3, Wis.
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glenn-Roberts Co., Inc., 2107 Adams St., Indianapolis 18, Ind.
Glo Heat Equipment Co., 1951 Grand Central Terminal Bldg., New York 17, N. Y.
Globe Phone Mfg. Co., 2 Linden St., Boston, Mass.
● Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Goese Mfg. Co., 2548 N. 18th St., Milwaukee 6, Wis.
Goethel Sheet Metal Wks., Alfred, 1910 N. Killian Pl., Milwaukee, Wis.
Goettl Bros. Metal Prod. Inc., 714 S. Central Ave., Phoenix, Ariz.
Golden-Anderson Valve Specialty Co., Keenan Bldg., Pittsburgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.
Gold Top Heating, Inc., 1400 E. Second St., Butte, Mont.
Goodrich Co., B. F., 548 S. Main St., Akron 18, O.
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O.
Goodyer Industries, Inc., 224 S. Michigan Ave., Chicago 4, Ill.
Gorman-Rupp Co., Mansfield, O.
Gorton Heating Corp., Cranford, N. J.
Goss Gas Products Co., 5209 Baum Blvd., Pittsburgh 24, Pa.
Gotham Instrument Co., Inc., 149 Wooster St., New York 12, N. Y.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 513 N. Blackwelder St., Oklahoma City 1, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17, N. Y.
Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12, Wis.
Grand Rapids Die & Tool Co., 1545 Madison S. E., Grand Rapids, Mich.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.
Graver Tank & Mfg. Co., Inc., 4809 Todd Ave., East Chicago, Ind.
Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Great National Air Conditioning Corp., 342 Oklahoma Natural Bldg., Oklahoma City, Okla.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., 780 Main St., Beacon, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockford, Ill.
Greer Hydraulics, Inc., 454 18th St., Brooklyn 15, N. Y.
Greiner Co., Emil, 161 Sixth Ave., New York, N. Y.
Grief, Edward C., 64 West End Ave., Bogota, N. J.
Griffin & Co., Inc., 500 Bergman Ave., Louisville, Ky.
Griffith Equipment Co., Inc., Los Angeles, Calif.

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● Grinnell Co., Inc., 260 W. Exchange, Providence 1, R. I.
Griscom-Russell Co., The, 285 Madison Ave., New York 17, N. Y.
Grobet File Corp. of America, 421 Canal St., New York 13, N. Y.
Gross-Aire Mfg. Co., 9416 W. Milton Ave., Overland 14, Mo.
Grove Regulator Co., 6529 Hollis St., Oakland, Calif.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.
Guardian Products Corp., 1215 E. 2nd St., Michigan City, Ind.
Guild & Garrison, Inc., 43 Keap St., Brooklyn 11, N. Y.
Gunnite Foundries Corp., 302 Peoples Ave., Rockford, Ill.
Gustin Bacon Mfg. Co., 1412 W. 12th St., Kansas City 7, Mo.
Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3, Mo.

H

H-A Mfg. Co., Box 346, York, Pa.
H. & A. Co., 86-100 Leroy Ave., Buffalo 14, N. Y.
H-B Instrument Co., 2518 N. Broad St., Philadelphia 32, Pa.
Haering & Co., Inc., D. W., 205 W. Wacker Dr., Chicago 6, Ill.
Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.
Hager Bros., East P. O. Box 1511, Rockford, Ill.
Hague & Co., Alfred, 230 Thirty-fourth St., Brooklyn 32, N. Y.
● Haines & Co., William S., 1010-12-14 Wood St., Philadelphia 7, Pa.
Halowax Products Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Halstead & Mitchell, Bessemer Bldg., Pittsburgh 22, Pa.
Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamer Oil Tool Co., 2919 Gardenia Ave., Long Beach 6, Calif.
Hamilton Rubber Mfg. Corp., Box 361, Trenton 3, N. J.
Hammel-Dahl Co., 243 Richmond St., Providence 3, R. I.
Hammett Electric Mfg. Co., 706-708 E. 18th St., Kansas City 8, Mo.
● Hammond Brass Wks., Summer Blvd., Hammond, Ind.
Hampton-Cross Co., The, 120 S. 10th St., Louisville 2, Ky.
Hampton Electric Mfg. Co., 1238 Voskamp St., Pittsburgh 12, Pa.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
● Haney Gas Burner & Engineers, 909 S. Myrtle Ave., Monrovia, Calif.
Hanovia Chemical & Mfg. Co., Chestnut St. & N. J. R. R. Ave., Newark 5, N. J.
Hansen Mfg. Co., Inc., Princeton 6, Ind.
Hanson-Gates Mfg. Co., Inc., 174 Lowell St., Reading, Mass.
Hardinge Oil Burner & Mfg. Co., 1700 Berteau St., Chicago 13, Ill.
Hardy, Inc., Charles, 420 Lexington Ave., New York, N. Y.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.
Harper Co., H. M., 2620 W. Fletcher, Chicago, Ill.
Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill.
Harris, A. R., 4546 Hohman Ave., Hammond, Ind.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland 2, O.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harrisburg Machinery Corp., 7th & Curtin St., Harrisburg, Pa.
Harrisburg Steel Corp., 10th & Herr Sts., Harrisburg, Pa.
Harry Cooling Towers, Inc., 554 W. 48th St., New York 19, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, Hamilton St., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn, N. Y.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave., Piqua, O.
Harvey-Whipple, Inc., Springfield, Mass.
Hasco Valve & Machine Co., 1819 W. St. Paul Ave., Milwaukee 3, Wis.
Haskell Mfg. Co., Wm. H., 20 Commerce St., Pawtucket, R. I.
Hastings Air Conditioning Co., Box 481, 108 S. Colorado Ave., Hastings, Neb.
Hastings Instrument Co., P. O. Box 1275, Hampton, Va.
Hausman Mfg. & Sales Co., Dept. HP, 1243 N. Harding Ave., Chicago 51, Ill.
Haveg Corp., Newark, Del.
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
● Hayes Furnace & Mfg. Co., 2929 S. Fairfax Ave., Los Angeles 16, Calif.
● Hays Corp., 782 E. 8th St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Health Trola Div., Excel Heating & Air Conditioning Co., 3715 Belmont Ave., Chicago 18, Ill.
Healy Ruff Co., 2257 University Ave., St. Paul 4, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Equipment not Inc., 1020 E. 75th St., Chicago 19, Ill.
Heat Timer Corp., 160 Fifth Ave., New York 10, N. Y.
Heat Transfer Products, Inc., P. O. Box 516, Carbondale, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heating Assurance, Inc., 124 E. Augusta St., Spokane 13, Wash.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henkel-Clauss Co., The, Fremont, O.
Henry Furnace Co., The, Medina, O.
● Henry Valve Co., Melrose Park (Chicago suburb), Ill.
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
Herbert Boiler Co., 2300 Bloomingdale Ave., Chicago, Ill.
Her-Born Engineering & Mfg. Co., 212 Columbus Ave., Sandusky, O.
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St. Louis 1, Mo.
Hercules Chemical Co., Inc., 332 Canal St., New York 13, N. Y.
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.
Hercules Float Wks., 200 Franklin St., Springfield, Mass.
● Heresite & Chemical Co., Manitowoc, Wis.
Hersey Mfg. Co., South Boston, Mass.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Hertner Electric Co., The, 12690 Elmwood Ave., Cleveland 11, O.
Hess Co., The, 1211 S. Western Ave., Chicago, Ill.
Hetzel Roofing Products Co., 67 Maine St., Newark 5, N. J.
Hexdall Co., A. M., Morris, Ill.
Highside Chemicals Co., 195 Verona Ave., Newark 4, N. J.
Hill Diesel Engine Div. of Indiana Motocycle Co., Lansing 3, Mich.
Hill, E. Vernon, 6826 W. Highland Ave., Chicago 31, Ill.
Hilo Varnish Corp., 55 Stewart Ave., Brooklyn 6, N. Y.
Hinde & Dauch Paper Co., P. O. Box 861, Sandusky, O.
Hinderliter Tool Co., The, Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Hirschman-Pohle Co., Inc., 12 Lent Ave., LeRoy, N. Y.
Hobart Bros., Co., Troy 1, O.
Hobsite Products Co., 835 River St., Paterson 4, N. J.
Hodge Boiler Wks., 99-111 Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., 135 Washington St., Taunton, Mass.
Hoffman Combustion Engineering Co., 710 Marquette Bldg., Detroit, Mich.
● Hoffman Specialty Co., 1001 York St., Indianapolis 7, Ind.
Hogan & Co., Inc., C. T., 383 Madison Ave., New York 17, N. Y.
Holby Valve Co., 1146 Second Ave., New York 21, N. Y.
Holcomb & Hoke Mfg. Co., Inc., 1545 Van Buren, Indianapolis 7, Ind.
Hollands Mfg. Co., Erie, Pa.
● Holsclaw Bros., Inc., 418 Willow Rd., Evansville 11, Ind.
Holtum Mfg. Co., Freeport, Ill.
Holtzer-Cabot, Div. The Leland Electric Co., Dayton 1, O.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hood Refining Co., 182 N. Hamilton Ave., Greensburg, Pa.
Hook & Ackerman, Inc., 18 E. 41st St., New York 17, N. Y.
Hoover Co., Kingston-Conley Div., 68 Brook Ave., North Plainfield, N. J.
Hoppes Mfg. Co., Inc., 850 N. Belmont Ave., Springfield, O.
Horn Co., A. C., 10th St. & 44th Ave., Long Island City, N. Y.
Horton Mfg. Co., 3016 University Ave., S. E., Minneapolis 14, Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotpoint Inc., 5600 W. Taylor St., Chicago 44, Ill.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co, E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Howard Iron Wks. & Alberger Heater Div., 287 Chicago St., Buffalo 4, N. Y.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.
Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Hubbell Corp., 319 N. Albany Ave., Chicago 12, Ill.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hunt & Son, C. B., Inc., Salem, O.
Hunter Fan & Ventilating Co., Inc., 400 S. Front St., Memphis, Tenn.
Hupp Corp., Globe Stamping Div., 1250 W. 76th St., Cleveland 2, O.
● Hussey & Co., C. G., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hydro-Aire, Inc., 3000 Winona, Burbank, Calif.

I

Ice Cooling Appliance Corp., Morrison, Ill.
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Industries, Inc., 1096 Parke Ave., Syeamore, Ill.
Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
● Illinois Engineering Co., 2035 S. Racine Ave., Chicago 8, Ill.
Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago 14, Ill.
Illinois Oil Products, Inc., 4th Ave. and 24th St., Rock Island, Ill.
● Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10, Ill.
Illinois Zinc Co., 2959 W. 47th St., Chicago 32, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Imperial Electric Co., 64 Ira Ave., Akron, O.
Independent Pneumatic Tool Co., 753 Claim, Aurora, Ill.
● Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Indiana Fan Company, 427 S. Alabama St., Indianapolis 4, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Industrial Engineering & Equipment Co., 711 S. Theresa Ave., St. Louis 3, Mo.
Industrial Mfg. & Engineering Co., 3845 N. Ravenswood Ave., Chicago 13, Ill.
Industrial Metal Protectives, Inc., 11 W. Monument Bldg., Rm. 314, Dayton, O.
Industrial Screw Co., 711 W. Lake St., Chicago 6, Ill.
Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee, 14, Wis.
● Infra Insulation, Inc., 10 Murray St., New York, N. Y.
● Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inland Steel Products Co., P. O. Box 393, Milwaukee 1, Wis.
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Instant Drying Corp., 101 Park Ave., New York, N. Y.
Insto-Gas Corp., 1977 E. Woodbridge St., Detroit 7, Mich.
Instrument Associates, Inc., 134 Broadway, Brooklyn 11, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2, Minn.

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Insul-Wool Insulation Corp., Wichita 12, Kans.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis, Ill.
Interchemical Corp., Finishes Div., 57 State St., Newark 1, N. J.
International Boiler Works, East Stroudsburg, Pa.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Engineering Wks., Inc., Box 71, Framingham, Mass.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Moistening Co., 489 S. Main St., Providence, R. I.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Nutyp Tool Co., 68 W. First St., Oswego, N. Y.
International Powder Metallurgy Inc., Ridgway, Pa.
International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill.
International Sales Co., 2045 Evans Ave., San Francisco 24, Calif.
International Steel Co., 1545 Edgar St., Evansville, Ind.
International Vermiculite Co., Girard, Ill.
Interstate Sales Co., 123 E. 18th St., New York 3, N. Y.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32, Pa.
Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland 11, O.
Irving Flexible Coupling Co., Inc., 1516 W. Slauson Ave., Los Angeles 44, Calif.
Irvington Varnish and Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

J

J O Mfg. Co., 8442 Otis St., South Gate, Calif.
Jabsco Pump Co., 2031 Lincoln St., Burbank, Calif.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Jackson Co., Byron, P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.
● Jackson Co., Thomas M., 614 Michigan Bldg., Detroit 26, Mich.
● Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jacobs Co., B. & J., 1729 John St., Cincinnati 14, O.
Jacuzzi Bros., Inc., 5327 Jacuzzi Ave., Richmond, Calif.
Jaden Mfg. Co., 1601 Second St., Hastings, Neb.
Jamar Co., Walker, 367 S. First Ave., E. Duluth, Minn.
Jamieson Mfg. Co., 819 Bedford, Dallas, Tex.
Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.
Jarecki Mfg. Co., 1345 W. 12th St., Erie, Pa.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
● Jefferson Union Co., 601 W. 26th St., New York 1, N. Y.
Jeffrey Mfg. Co., 859 N. Fourth St., Columbus 16, O.
● Jenkins Bros., 80 White St., New York 13, N. Y.
Jenn Air Products Co., 409 Architects Bldg., Indianapolis, Ind.
Jennison Co., 17 Putnam St., Fitchburg, Mass.
Jessop Steel Co., Washington, Pa.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., Lloyd S., 2241 Indiana Ave., Chicago 16, Ill.
Johnson Co., S. T., 401 N. Broad St., Philadelphia 8, Pa.
Johnson Corp., The, 806 Wood St., Three Rivers, Mich.
Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago 7, Ill.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Heater Corp., 12 Newhall Ave., Saugas, Mass.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
● Johnson Service Co., 507 E. Michigan St., Milwaukee 2, Wis.
Johnston Bros., Inc., Ferrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston & Jennings, 877 Addison Rd., Cleveland 14, O.
Johnston Tin Foil & Metal Co., The, 6100 S. Broadway, St. Louis 11, Mo.
Joliet Chemicals, Inc., Industry Ave., Joliet, Ill.
Jones Foundry & Machine Co., W. A., 4401 Roosevelt Rd., Chicago 24, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh 30, Pa.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 4, Ind.
● Joy Mfg. Co., Henry W., Oliver Bldg., Pittsburgh 22, Pa.
Justrite Mfg. Co., 2061 N. Southport Ave., Chicago, Ill.
Justus Steam Trap Co., Napanoch, N. Y.

K

Kainer & Co., 763 W. Lexington St., Chicago 7, Ill.
Kaiser Co., E. B., 625 Webster Ave., Chicago 14, Ill.
Kaiser Co., H. S., 3336 Franklin Blvd., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Kauffman Air Conditioning Corp., 4336 W. Pine Blvd., St. Louis 8, Mo.
Kaufman Co., H. J., The, 13215 Roselawn Ave., Detroit 4, Mich.
Kaye & McDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Keasbey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 400 W. Madison St., Chicago 6, Ill.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 135 S. La Salle St., Chicago 3, Ill.
Keller Tool Co., P. O. Box 268, Grand Haven, Mich.
Kellogg Co., M. W., The, 225 Broadway, New York 7, N. Y.
Kelley Koett Mfg. Co., The, 212 W. 4th St., Covington, Ky.
Kelvin-White Co., 90 State St., Boston 9, Mass.
Kelvinator Div., Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32, Mich.
Kenite Laboratory, Inc., 83 Muray, New York 7, N. Y.
● Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kensico Tube Co., Mt. Kisco, N. Y.
Kerentoff, G. L., 2218 Reading Rd., Cincinnati 2, O.
Kern Co., John A., 224 N. Loomis St., Chicago 7, Ill.
Kernchen Co., 333 N. Michigan, Chicago, Ill.
Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
● Kewanee Boiler Corp., Franklin St. and "Q" Tracks, Kewanee, Ill.
● Key Co., 2617 McCasland, East St. Louis, Ill.
Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.
Keystone Carbon Co., Inc., St. Marys, Pa.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
Kieley & Mueller, Inc., 2015 43rd St., North Bergen, N. J.
Kimberly-Clark Corp., Neenah, Wis.
Kindl-Air Corp., 1480 W. 112th St., Cleveland, Ohio
Kinetic Chemicals, Inc., 10th & Market Sts., Wilmington 98, Del.
● King Co., The, 928 N. Cedar St., Owatonna, Minn.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Union Co., Inc., Hillsgrove, R. I.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y.
Kingston Products Corp., 1415 N. Webster, Kokomo, Ind.
Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 2838-52 Spring Grove Ave., Cincinnati, O.
Kisco Boiler & Engineering Co., 3732-40 Chouteau Ave., St. Louis 10, Mo.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago 12, Ill.
Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill.
Klingerit, Inc., 16-22 Hudson St., New York 13, N. Y.
Klipfel Mfg. Co., 1000 Weiler Ave., Hamilton, O.
Klomparens Lock-Joint Mfg. Co., Inc., 4600 Bowen Rd., S. E., Washington 19, D. C.
Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
Knickerbocker Co., 603 Liberty St., Jackson, Mich.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knowles Mushroom Ventilator Co., 583 Upper Mountain Ave., Upper Montclair, N. J.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kold-Hold Mfg. Co., Lansing 4, Mich.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Inc., Bartlett Hayward Div., 200 Scott St., Baltimore 3, Md.
Koppers Co., Inc., Tar Products Div., Koppers Bldg., Pittsburgh 19, Pa.
Korfund Co., Inc., 48-01-F 32nd Pl., Long Island City 1, N. Y.
Koven & Bro., L. O., Inc., 154 Ogden Ave., Jersey City 7, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves., Hackensack, N. J.
Kramer Trenton Co., N. Olden & Bruening Aves., Trenton 5, N. J.
Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.
Kresno-Stamm Mfg. Co., (America), Inc., 345 Commercial Ave., Palisades Park, N. J.
● Kritzer Radiant Coils, Inc., 2901 W. Lawrence Ave., Chicago 25, Ill.
● Krueger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
● Kuhns Bros. Co., Dayton 1, O.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kwikon Co., 1850 W. Washington, Chicago 12, Ill.

L

La Bour Co., Inc., The, 1301 Sterling Ave., Elkhart, Ind.
Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis 1, Mo.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
Laclede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
● Ladish Co., 5300 S. Packard Ave., Cudahy, Wis. (Milwaukee Suburb)
Lake Chemical Co., 607 N. Western Ave., Chicago 12, Ill.
Lamb Electric Co., Kent, O.
Lammert & Mann Co., 221 N. Wood St., Chicago 12, Ill.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Lancaster Heat Transfer Co., Inc., 123 DeKalb Ave., Brooklyn, N. Y.
Landis & Gyr, Inc., 104 Fifth Ave., New York 11, N. Y.
Landis Machine, Inc., Fifth and Church Sts., Waynesboro, Pa.
Larkin Coils, 519 Memorial Dr., S. E., Atlanta 1, Ga.
Larkin Packer Co., 6200 Maple Ave., St. Louis 14, Mo.
Lastik Products Co., Inc., 1106 Keenan Bldg., Pittsburgh 22, Pa.
Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
Layne & Bowler, Inc., Box No. 215, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5919 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Lee Co., K. O., Aberdeen, S. D.
Lee Engineering Co., 95 River St., Hoboken, N. J.
Lee & Son, Thomas, 128-132 W Second St., Cincinnati 2, O.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.

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Lees, John, Div., The, Serrick Corp., Batavia St. and Kilgore Ave., Muncie Ind.
Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Leinweber Propellers, 8448 Crandon, Chicago, Ill.
Leland Electric Co., 1501 Webster St., Dayton 1, O.
Lenk Mfg. Co., 30 Cummington St., Boston 15, Mass.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, Ohio
Leonard Precision Products Co., 1100 Larson Ave., Garden Grove, Calif.
Leonard Valve Co., Elmwood Station, Providence 7, R. I.
Leslie Co., Valley Brook & Grant Aves., Lyndhurst, N. J.
Leslie Welding Co., 2943 Carroll Ave., Chicago 12, Ill.
Levow, David, 308 W. 20th St., New York 11, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
● Lewin-Mathes Co., Lewin Metals Div., 1111 Chouteau Ave., St. Louis 2, Mo.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3, Mo.
Lewis & Co., Joseph E., 1319 Carroll St., Baltimore, Md.
● Lexington Supply Co., 106 Lexington Ave., Cleveland, O.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Liberty Motors & Engineering Corp., Coolidge & Constance Aves., Arbutus, Baltimore 29, Md.
Lieblich Oil Burner Inc., 36 W. 66th St, New York, N. Y.
Lientz Co., B. P., P. O. Box 2275, Kansas City, Mo.
● Lilie-Hoffmann Cooling Towers, Inc., 4239 Duncan Ave., St. Louis 10, Mo.
Lima Electric Motor Co., Lima, O.
Lincoln Electric Co., The, 12818 Coit Rd., Cleveland 1, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Lindsay Corp., The, 1740 25th Ave., Melrose Park, Ill.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1; 300 W. Pershing Rd., Chicago 9, 519 N. Holmes Ave. and 220 S. Belmont Ave., Indianapolis 6, Ind., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Lintern Co., 60 Lincoln Ave., Berea, O.
Lion Mfg. Corp., 2701-11 Belmont Ave., Chicago, Ill.
Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquid Conditioning Corp., 114 E. Price St., Linden, N. J.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Lithgow Corp., 333 W. 40th Pl., Chicago 9, Ill.
Little Mfg. Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, O.
Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 W. Roosevelt Rd., Chicago 50, Ill.
Lockjoint Wood Products Co., 1114 S. Santa Fe, Wichita 11, Kan.
Locknut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Lodge & Shipley Machine Tool Co., 805 Evans St., Cincinnati 4, O.
Logan Engineering Co., Lawrence & Lamon Ave., Chicago 30, Ill.
Loline Steel Boiler Co., 235 Penn St., Allentown, Pa.
Lonergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Lonergan Mfg. Co., Albion, Mich.
Long Mfg., Div. Borg-Warner Corp., 12501 Dequindre St., Detroit, Mich.
Lookout Boiler & Mfg. Co., Compress St. & Mfrs. Rd., Chattanooga 1, Tenn.
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.
Louisville Drying Machinery Co., Div., General American Transportation Corp., Hoffman Bldg., 4th & Market Sts., Louisville, Ky.
Lovejoy Flexible Coupling Co., 5081 W. Lake St., Chicago 44, Ill.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Loyal Knight Stokers, Inc., 800 Scheel St., Belleville, Ill.
Ludlow Valve Mfg. Co., Inc., Foot of Adams St., Troy, N. Y.
Lukens Steel Co. and Divisions, 308 S. First Ave., Coatesville, Pa.
Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., 426 First St., South Boston 27, Mass.
Lunkenheimer Co., Waverly & Beekman Sts., Cincinnati 14, O.
Lustra Corp. of America, 40 W. 25th St., New York 10, N. Y.
Luzerne Rubber Co., Muirhead Ave., Trenton 9, N. J.
Lynch Mfg. Corp., 3600 Summit St., Toledo 1, O.
Lynchburg Foundry Co., Peoples Bank Bldg., Lynchburg, Va.
Lyon, Conklin & Co., Inc., McComas & Race Sts., Baltimore 30, Md.

M

M B Mfg. Co., Inc., The, 1060 State St., New Haven 11, Conn.
Mass & Waldstein Co., 438 Riverside Ave., Newark 4, N. J.
MacDermid Chemical Co., Bristol, Conn.
Macksons Co., 125 Cedar St., New York 6, N. Y.
MacLean-Fogg Lock Nut Co., 2653 N. Kildare, Chicago 39, Ill.
MaGirl Foundry & Furnace Co., 413 E. Oakland Ave., Bloomington, Ill.
Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.
MagniLastic Div., Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc, 1728 Second St. N., Minneapolis 11, Minn.
● Maid-O'-Mist, Inc., 3215 N. Pulaski Rd., Chicago 41, Ill.
Maintenance Engineering Corp., 3611 Clinton Dr., Houston, Tex.
Majestic Co., 733 Erie St., Huntington, Ind.
Majot Automatic Machine Co., Inc., 88 Main St., East Orange, N. J.
Mall Tool Co., 7740 S. South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manheim Mfg. & Belting Co., Manheim, Pa.
Manitowoc Boiler Wks., 16th & The River, Manitowoc, Wis.
Manning, Maxwell & Moore, Inc., Bridgeport 2, Conn.
Mansfield & Green, 1051 Power Ave., Cleveland 14, O.
Manufacturers Machine Co., Railroad Ave., North Andover, Mass.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 298, Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Marco Co., Inc., 3rd & Church Sts., Wilmington 50, Del.
Marion Machine Foundry & Supply Co., Marion, Ind.
● Marley Co., Inc., The, 3001 Fairfax Rd., Kansas City 15, Kan.
Marlin-Rockwell Corp., Jamestown, N. Y.
● Marlo Coil Co., 6135 Manchester Ave., St. Louis 10, Mo.
Marman Products Co., Inc., 940 W. Florence Ave., Inglewood, Calif.
Marquette Mfg. Co., 401 Johnson St., Minneapolis, Minn.
Marsh Corp., Jas. P., 3501 Howard St.; Skokie, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Marsh Valve Co., 4th St., & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Martens & Stormoen, 15 Hathaway St., Boston 10, Mass.
Martin Co., Inc., J. O., 637 Minna St., San Francisco 3, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
Martin-Quaid Co., 1815 W. Sedgley Ave., Philadelphia 32, Pa.
● Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia 7, Pa.
Masonite Corp., 111 W. Washington St., Chicago 2, Ill.
Mason-Neilan Regulator Co., 1190 Adams St., Boston 24, Mass.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 21800 Miles Ave., Cleveland 22, O.
Maurey Mfg. Corp., 2911 S. Wabash Ave., Chicago 16, Ill.
May Oil Burner Div., Gerotor May Corp., Maryland Ave. and Oliver, Baltimore 3, Md.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., Inc., 4332 Horatio St., Detroit 10, Mich.
Maysteel Products, Inc., 740 N. Plankinton, Milwaukee 3, Wis.
McAlear Mfg. Co., 1921 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 405 Penn Ave., Pittsburgh 22, Pa.
● McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
● McDonnell & Miller, Inc., Wrigley Bldg., 400 N. Michigan Ave., Chicago 11, Ill.
McIntire Connector Co., 263 Jefferson St., Newark 5, N. J.
McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore.
● McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10, Mo.
McRay Products Co., 1156 E. Colorado St., Pasadena 1, Calif.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mears-Kane-Ofeldt, Inc., 1903-1915 E. Hagert St., Philadelphia 25, Pa.
Mechanical Industries Production Co., 217-223 Ash St., Akron 3, O.
Mechanical Products Corp., 168 N. Ogden Ave., Chicago 7, Ill.
Meco, Inc., Ft. of S. W. Woods St., P. O. Box 1610, Portland 7, Ore.
Medart Co., 100 Potomac St., St. Louis 18, Mo.
Meier Electric & Machine Co., Inc., 3525 E. Washington St., Indianapolis 7, Ind.
Mel Products Co., The, 554 Chapel St., New Haven, Conn.
Meletron Corp., 950 N. Highland Ave., Los Angeles 38, Calif.
Mel-Gauge Co., Crest Ave., East Haven, Conn.
Mellish & Murray Co., 1715 Carroll Ave., Chicago 12, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
● Mercoid Corp., The, 4201 Belmont Ave., Chicago 41, Ill.
Mercontrol Inc., 278 Pearl St., New York 7, N. Y.
Meriam Instrument Co., The, 10920 Madison Ave., Cleveland 2, O.
Mesker Steel Corp., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.
Metropolitan Refining Co., Inc., 50-23 Twenty-Third St., Long Island City 1, N. Y.
● Mettler Co., Lee B., 406 S. Main St., Los Angeles 13, Calif.
Meyer & Bro. Co., F., 1313 S. Adams St., Peoria 2, Ill.
Meyer Furnace Co., The, P. O. Box 989, Peoria 1, Ill.
Meyer Mfg. Co., 2536 Fourteenth St., Detroit 16, Mich.
Michigan Pipe Co., 506 Phoenix Bldg., Bay City, Mich.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Micro Switch Div. of First Industrial Corp., 1 E. Spring St., Freeport, Ill.
Midco Register Corp., 1059 Grand Ave., St. Paul, Minn.
Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
Midland Paint & Varnish Co., 3802 E. 91st St., Cleveland 5, O.
Mid-States Equipment Co., 2429 S. Michigan Ave., Chicago 16, Ill.
● Midwest Piping & Supply Co., Inc., 1450 S. Second St., St. Louis 4, Mo.
Midwest Products Co., Port Byron, Ill.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller-Harris Instrument Co, 836 N. 4th St., Milwaukee 3, Wis.
Millers Falls Co., 57 Wells St., Greenfield, Mass.

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Mills Corp., Elmer E., 153-159 W. Huron St., Chicago 10, Ill.
Mills Industries, Inc., 4110 W. Fullerton Ave., Chicago, Ill.
Milwaukee Gas Specialty Co., P. O. Box 461, Milwaukee, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee 7, Wis.
Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.
Mineral Insulation Co., 103rd & Southwest Highway, Chicago Ridge, Ill.
Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
Minimite Co., 4518 W. Lexington St., Chicago 24, Ill.
● Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn.
Minneapolis Mining & Mfg. Co, 900 Fauquier Ave., St. Paul, Minn.
Minn-Kota Foundry & Mfg. Co., P. O. Box 822, Fargo, N. D.
Miracle Adhesives Corp., 214 E. 53rd St., New York 22, N. Y.
Mir-O-Col Alloy Co., 2416 E. 53rd St., Los Angeles 11, Calif.
Misener Mfg. Co., Inc., 200-8 Walton St., Syracuse 2, N. Y.
Mission Appliance Corp., 7101 McKinley Ave., Los Angeles 1, Calif.
Mississippi Glass Co., 200 Fifth Ave., New York 10, N. Y.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia 46, Pa.
Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago, Ill.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
● Modine Mfg. Co., 1509 De Koven Ave., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34, Pa.
Monash-Younger Co., Inc., 1315 W. Congress St., Chicago 7, Ill.
Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.
Monitor Controller Co., The, 51 S. Gay St., Baltimore 2, Md.
Monogram Products Co., 731 N. 35th St., Philadelphia 4, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Monsanto Chemical Co., Merimac Div., Everett Sta., Boston 49, Mass.
Montag Stove & Furnace Wks., 2011 N. Columbia Blvd., Portland 3, Ore.
Montgomery Bros., 1122 Howard St., San Francisco, Calif.
Moore Co., Goodloe E., 2811 N. Vermilion, Danville, Ill.
● Moore Co., The, 544 Westport Rd., Kansas City, Mo.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Moran Flexible Joint Co., Inc., 217 W. Main St., Louisville, Ky.
Morehead Mfg. Co., 2455 W. Warren Ave., Detroit 8, Mich.
Morey, Dan, Box 85, Los Angeles 35, Calif.
Morf Industries, Inc., 780 Manor Rd., Staten Island 2, N. Y.
Morheat Corp., 700 E. Kalamazoo, Lansing, Mich.
Morris Coupling & Clamp Co., 49 Duncan Ave., Elwood City, Pa.
Morris Machine Wks., 50 E. Genesee St., Baldwinsville, N. Y.
Morrison Brothers Co., Dubuque, Ia.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Chain Co., 7601 Central Ave., Detroit 8, Mich.
Morse-Smith-Morse, Inc., 165 Dexter Ave., Watertown 72, Mass.
Mortell Co., J. W., Kankakee, Ill.
Morton-Gregory Corp., 518 Jefferson Ave., Toledo 4, O.
Motionair Co., 3319 E. Slauson Blvd., Los Angeles 11, Calif.
Mouat Vapor Heating Co., The, 1246-1254 W. 4th St., Cleveland 13, O.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., 512 W. Cerro Gordo St., Decatur, Ill.
Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8, Minn.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
● Mundet Cork Corp., 7101 Tonnelle Ave., North Bergen, N. J.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., 130 Lister Ave., Newark 5, N. J.
Munton Mfg. Co., 9400 Belmont Ave., Franklin Park, Ill.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
● Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 209 First Ave., Pittsburgh 22, Pa.
Mystik Adhesive Products Div., Chicago Show Printing Co., 2635 N. Kildaire, Chicago 39, Ill.

N

Naco Mfg. Co., Box 310, Huntington Park, Calif.
● Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., 7663 Epworth Blvd., Detroit 4, Mich.
Nat Corp., 2710 McGee St., Kansas City 8, Mo.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Air Conditioning Inc., Johnstown, Pa.
National Airoil Burner Co., Inc., 1284 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6215 W. 66th Pl., Chicago 38, Ill.
National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
National Carbon Co., 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.
National Engineering & Mfg. Co., 519 Wyandotte, Kansas City 6, Mo.
National Engineering Products, Inc., Commerce and Savings Bldg., Washington, D. C.
National Gas Equipment Co., Inc., Terrell, Tex.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Heater Co., 2182 Cleora Ave., St. Paul 4, Minn.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Lining Co., 326 W. Washington, Chicago, Ill.
National Lock Co., Inc., 1902 Seventh St., Rockford, Ill.
National Machine Wks., 122 S. Michigan Ave., Chicago 3, Ill.
● National Metal Fabricators, 2138 S. Sawyer, Chicago 23, Ill.
National Meter Co., 4221 First Ave., Brooklyn 32, N. Y.
National Oil Burner Co. of N. Y. Inc., 614 Bergen St., Brooklyn, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
National Pipe Coatings, Inc., 315 W. 9th St., Los Angeles 15, Calif.
National Pumpless Blowtorch Co., 7500 Stanton Ave., Cleveland, O.
● National Radiator Co., The, 221 Central Ave., Johnstown, Pa.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Time & Signal Corp., 21800 Wyoming Ave., Detroit 20, Mich.
National Tube Co., United States Steel Corp., Subsidiary, Frick Bldg., Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
Naugatuck Mfg. Co., Union City, Conn.
Naylor Pipe Co., 1251 E. 92nd St., Chicago 19, Ill.
Nebel Mfg. Co., P. O. Box 3942, Shaker Square Sta., Cleveland 20, O.
Neilson Chemical Co., 6564 Benson Ave., Detroit 7, Mich.
Nelson Chemical Pumps, Box 2235, Casper, Wyo.
Nelson Corp., Herman, 1824 Third Ave., Moline, Ill.
Nelson Mfg. Co. B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Specialty Welding Equipment Corp., 440 Peralta Ave., San Leandro, Calif.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
● Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa.
Nevinger Mfg. Co., Inc., Greenville, Ill.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.
● New England Cooling Tower Co., 88 Broad St., Boston 10, Mass.
New Haven Copper Co., Seymour, Conn.
New Jersey Zinc Sales Co., Front & Fletcher Sts., New York 7, N. Y.
New York Air Valve Corp., 611-621 Broadway, New York, N. Y.
● New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York, N. Y.
Newark Boiler Regulator Co., Inc., 15 Ward St., Bloomfield, N. J.
Newark Transformer Co., Linden & Park Ave., Linden, N. J.
Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
● Newman Co., Inc., I. C., 30 E. 40th St., New York 16, N. Y.
Newport Rolling Mill Co., Div. National Detrola Corp., Ninth & Lowell Sts., Newport, Ky.
Niagara Blower Co., 405 Lexington Ave., Room 3117, New York 17, N. Y.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40, Pa.
● Nicholson & Co., W. H., 198 Oregon St., Wilkes-Barre, Pa.
Nikoh Tube Co., 5001 S. Kedzie, Chicago 32, Ill.
Niles Rolling Mill Co., Niles, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 91, Conn.
Nooter Boiler Works Co., John, 1400 S. Second St., St. Louis 4, Mo.
Nordstrom Valve Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Norgren Co., C. A., 222 Santa Fe Dr., Denver 9, Colo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Products Co., Inc., 1150 Chesapeake Ave., Columbus, O.
Norristown Magnesia & Asbestos Co., Washington St., Norristown, Pa.
North American Fibre Products Co., The, Standard Bldg., Cleveland 13, O.
North American Mfg. Co., 4455 E. 71st St., Cleveland, O.
North American Philips Co., Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.
North Penn Co., 32 E. 21st St., New York 10, N. Y.
Northern Blower Co., 6409 Barberton Ave., Cleveland 2, O.
Northern Equipment Co., 1945 Grove Drive, Erie 6, Pa.
Northern Indiana Brass Co., 935 Plum St., Elkhart, Ind.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria 4, Ill.
Northern Weatherstrip Co., 367 S. First Ave., E. Duluth, Minn.
Northwest Foundry & Furnace Co., 2345 S. E. Gladstone St., Portland 2, Ore.
Northwest Lead Co., 2700 16th Ave., S. W., Seattle 4, Wash.
Norwin Co., E. Album St., Freeport, Ill.
Norwood Filtration Co., The, 380 Dwight St., Holyoke, Mass.
Nutmeg Chemical Co., 223 State, New Haven, Conn.
Nu-Way Corp., The, 2416 4th Ave., Rock Island, Ill.
Nye Tool Co., 4120-30 Fullerton Ave., Chicago 39, Ill.

O

OPW Corp., 2735 Colerain Ave., Cincinnati 25, O.
Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Obear, E. L., 10224 S. Figueroa St., Los Angeles, Calif.
Oberdorfer Industries, Inc., 3007 Thompson Rd., Syracuse, N. Y.
O'Brien Corp., The, South Bend 21, Ind.
O'Brien Steam Specialty Co., Inc., 205 Harrison St., Syracuse 4, N. Y.
O'Brien Industries, 84 Bishop St., Jersey City 4, N. J.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Chemical & Mfg. Co., The, 1400 E. Washington, Madison, Wis.
Ohio Electric Mfg. Co., 5925 Maurice Ave., Cleveland 4, O.
● Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pipe Bending & Machine Co., 3900-3910 Trent Ave., Cleveland 9, O.
Ohio Products Co., 16113 Munn Rd., Cleveland 11, O.
Ohl & Son, George A., 159 Oraton St., Newark, N. J.
Ohmlac Paint & Refining Co., 92 Liberty St., New York 6, N. Y.

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Oil Equipment Mfg. Corp., P. O. Box 1533 New Haven 6, Conn.
Oilux Co., 2200 Dwenger Ave., Fort Wayne 4, Ind.
Olsen Testing Machine Co., Tinius, Easton Rd., Willow Grove, Pa.
● Olson & Co., Arthur A., Canfield, O.
O'Neil Irwin Mfg. Co., 800 Jefferson, Lake City, Minn.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis 13, Mo.
Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Oster Mfg. Co., 2057 E. 61st Pl., Cleveland 3, O.
Ostlind Valve, Inc., 601 N. E. 28th Ave., Portland 12, Ore.
OverSpred Stoker Co., 77 Washington St., Suite 1702, Chicago 2, Ill.
● Owens-Corning Fiberglas Corp., 1911 Nicholas Bldg., Toledo 1, O.
Ozalid Div. of General Aniline & Film Corp., Ansco Rd., Johnson City, N. Y.
Ozone Air Co., 1132 Division Ave., S., Grand Rapids 7, Mich.

P

Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Mfg. Co., 737 Guardian Bldg., Cleveland 14, O.
Pacific Pumping Co., 960 Howard St., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco, Calif.
Pacific Steel Boiler Div., United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.
Packless Metal Products Corp., 31 Winthrop Ave., New Rochelle, N. Y.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2951 W. Carroll Ave., Chicago 12, Ill.
Pains Fireworks Display Co., Inc., 11 Park Pl., New York 7, N. Y.
Palmer Electric Co., 20 Sproat St., Detroit 1, Mich.
Palmer Mfg. Corp., 2200 W. Filmore St., Phoenix, Ariz.
Palmer Thermometers, Inc., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Palnut Co.; 73 Cordier St., Irvington, N. J.
Pan-American Engineering Co., 820 Parker St., Berkeley 2, Calif.
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Pangborn Corp., 400 Pangborn Blvd., Hagerstown, Md.
Pan-L-Heat Corp., 2838 N. E. Columbia Blvd., Portland, Ore.
Paraffine Cos., Inc., The Insulation Div., 475 Brannon St., San Francisco 19, Calif.
Paragon Electric Co., 1600 Twelfth St., Two Rivers, Wis.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Paramount Products Co., 545 Fifth Ave., New York, N. Y.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.
Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
Patent Novelty Co., 312 Eighth St., Fulton, Ill.
Patrol Valve Co., The, 2310 E. Superior Ave., Cleveland 14, O.
Patten Co., J. V. 500 De Kalb Ave., Sycamore, Ill.
Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.
● Patterson-Kelley Co., Inc., The, 107 Warren St., East Stroudsburg, Pa.
Paul-Lewis Laboratories, Inc., 4253 N. Port Washington Rd., Milwaukee 12, Wis.
Paul Valve Corp., 683 Third Ave., New York 17, N. Y.
Payne Furnace Co., 336-338 N. Foothill Rd., Beverly Hills, Calif.
Peabody Engineering Corp., 580 Fifth Ave., New York 19, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago 18, Ill.
Peck & Harvey, 5736 N. Western Ave., Chicago 45, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St., and Penna. R. R., Philadelphia 40, Pa.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Peer, Inc., 1440 Milton St., Benton Harbor, Mich.
Peerless of America, Inc., 2901 Lawrence Ave., Chicago 25, Ill.
Peerless Electric Co., 1401 W. Market St., Warren, O.
Peerless Mfg. Corp., 1400 W. Ormsby St., Louisville, Ky.
Peerless Pump Div., Food Machinery & Chemical Corp., 301 West Ave., 26, Los Angeles 31, Calif.
Peerless Unit Ventilation Co., Inc., 810 Union Ave., Bridgeport, Conn.
Penberthy Injector Co., 1242 Holden Ave., Detroit 2, Mich.
Penetone Co., The, Tenafly, N. J.
Penn Boiler & Burner Co., 359 N. Market St., Lancaster, Pa.
Penn Brass & Copper Co., 3800 W. 20th St., Erie, Pa.
● Penn Electric Switch Co., P. O. Box 556, Goshen, Ind.
Penn Galvanizing Co., 2201 E. Tioga St., Philadelphia 34, Pa.
Penn Industrial Instrument Corp., 3116 N. 17th St., Philadelphia, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P. O. Box 484, Washington, Pa.
Penn Ventilating Co., Goodman above Allegheny Ave., Philadelphia 40, Pa.
Pennsylvania Engineering Wks., 526 E. Jefferson St., New Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia 7, Pa.
% Proportioneers, Inc. %, 156 Codding St., Providence 1, R. I.
Perfect Circle Corp., Hagerstown, Md.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 7, Mass.
Perfection Refrigeration Parts Co., Harvey, Ill.
Perfection Stove Co., 7609 Platt Ave., Cleveland 4, O.
Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wis.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Permanente Products Co., Kaiser Bldg., Oakland 12, Calif.
Permatex Co., Inc., 1716-1720 Avenue Y, Brooklyn 29, N. Y.
Permutit Co., 330 W. 42nd St., New York 18, N.Y.
Perolin Co., Inc., 1112 W. 37th St., Chicago 9, Ill.
Persson Co., T. G., 224 Glenwood Ave. Bloomfield, N. J.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
Peterson Co., B. A., 300 W. R. R. Ave., Dowagiac, Mich.
Petroleum Equipment Mfg. Co., 75 Brewster St., New Haven, Conn.
● Petroleum Heat & Power Co., Stamford, Conn.
Petrometer Corp., 1 Star Sq., Long Island City 1, N. Y.
Pfening Co., Fred D., The, 1075 W. 5th Ave., Columbus 12, O.
Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York 5, N. Y.
Phelps Mfg. Co., 810 Thomas St., Little Rock, Ark.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40, Pa.
Philadelphia Thermometer Co., 6th & Cayuga St., Philadelphia 40, Pa.
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.
Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 114 Liberty St., New York 6, N. Y.
Phoenix Brass Fittings Corp., Coit St. & Chancellor Ave., Irvington 11, N. J.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Ventilator Co., Inc., 1665 63rd St., Brooklyn, N. Y.
Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
Photovolt Corp., 95 Madison Ave., New York 16, N. Y.
Pick Mfg. Co., West Bend, Wis.
Pierce Co., Wm. B., The, 704 Elmwood Ave., Buffalo 3, N. Y.
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pines Engineering Co., Inc., 601 Walnut St., Aurora, Ill.
Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla.
Piqua Machine & Mfg. Co., Piqua, O.
Piston Ring Div., Koppers Co., Inc., Bush & Hamburg Sts., Baltimore, Md.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.
Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh 22, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Pittsburgh Lectrodryer Corp., 327 32nd St., Pittsburgh 30, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna 23, Pa.
Pittsburgh Piping & Equipment Co., 10 43rd St., Pittsburgh 1, Pa.
Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., 212 Wood St., Pittsburgh 22, Pa.
Pittsburgh Valve & Fittings Co., Barberton, O.
Pittsburgh Water Heater Corp., Box 4452, Pittsburgh 5, Pa.
Plasteel Products Co., McAdams Ave., Washington, Pa.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastic Products Co., 6475 Georgia Ave., Detroit 11, Mich.
Pleasantaire Corp., Tower Bldg., Washington 5, D. C.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14, Ill.
Plumb Mfg. Co., 1925 Dwyer Ave., Utica 3, N. Y.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., 340 E. 131st St., Cleveland 8, O.
Poe Co., C. W., The, Mayfield at Lee, Cleveland 18, O.
Pokorney Mfg. Co., 3117 Clybourn Ave., Chicago, Ill.
Polo Pump Co., Polo, Ill.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
Portable Electric Tools, Inc., 255 W. 79th St., Chicago 20, Ill.
Porter Co., Inc., H. K., 1932 Oliver Bldg., Pittsburgh 22, Pa.
● Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 5, N. J.
Positive Control Co., The, 2818 Spring Grove Ave., Cincinnati 25, O.
Potter & Brumfield Sales Co., 549 W. Washington Blvd., Chicago 6, Ill.
Powder Power Tool Corp., Ft. of S. W. Woods St., P. O. Box 1610, Portland 7, Ore.
Powder Weld Process Co., The, 419 Kent Ave., Brooklyn, N. Y.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
Power Piping Div., Blaw Knox Co., 829 Beaver Ave., Pittsburgh 12, Pa.
Powermatic Ventilator Co., 4019 Prospect Ave., Cleveland 3, O.
● Powers Regulator Co., 2720 Greenview Ave., Chicago 14, Ill.
● Prat-Daniel Corp., 70 Water St., East Port Chester, Conn.
Precision Scientific Co., 3737 Cortland St., Chicago 47, Ill.
Precision Thermometer & Instrument Co., 1488 Brandywine St., Philadelphia 30, Pa.
Precision Welder & Machine Co., 138 E. McMicken Ave., Cincinnati 10, O.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Presstite Engineering Co., 3900 Chouteau St., St. Louis 10, Mo.
● Pritchard & Co., J. F., Equipment Div., 908 Grand Ave., Kansas City 6, Mo.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
Products Research Co., 634 S. Western Ave., Los Angeles 5, Calif.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Protective Coatings, Inc., P. O. Box 3985, Stratmore Station, Detroit 27, Mich.
● Prox Co., Inc., Frank, 1201 S. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20, Mo.
Pure Carbonic, Inc., 60 E. 42nd St., New York 17, N. Y.
● Pyle-National Co., The, 1373 W. 37th St., Chicago 9, Ill.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago 7, Ill.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.

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Q

Q-P Mfg. Co., Needham Heights, Mass.
Quaker City Iron Wks., Allegheny & Tulip St., Philadelphia 34, Pa.
Quaker Rubber Corp., Comly & Milnor Sts., Philadelphia 24, Pa.
Quality Specialty Co., Inc., 211 N. 2nd St., Philadelphia 6, Pa.
Quickwork Div., Whiting Corp., Harvey, Ill.
Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.
Quijada Tool Co., Inc., 5474-78 Alhambra Ave., Los Angeles 32, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Oliver Bldg., Pittsburgh 22, Pa.

R

R-S Products Corp., Germantown Ave. at Wayne Junction, Philadelphia 44, Pa.
Radiant Devices, 4030 Chouteau Ave., St. Louis, Mo.
Radiant Heat Sales Engrg. Co., 3841 Broadway, Gary, Ind.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco, Inc., 601 W. 5th Ave., Columbus 1, O.
● Randall Graphite Bearings, Inc., 609 W. Lake St., Chicago 6, Ill.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., The, 271 Church St., New York 13, N. Y.
● Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco 12, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Rayfield Co., C. L., 2010-18 S. Halsted St., Chicago 8, Ill.
Raymond Pulverizer Div., Combustion Engineering Co., 1324 N. Branch St., Chicago, Ill.
Raytheon Mfg. Co., Commercial Products Div., Waltham 54, Mass.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Reading Tube Corp., Empire State Bldg., New York 1, N. Y.
Ready-Power Co., The, 11231 Freud Ave., Detroit 14, Mich.
Red Jacket Mfg. Co., Davenport, Ia.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redmond Co., Inc., Owosso, Mich.
Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pulley Co., H. P., Columbus, Ind.
Refinite Corp., Refinite Bldg., Omaha 8, Neb.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago, Ill.
Refrigeration Economics Co., Inc., 1231 Tuscarawas E., Canton 2, O.
Refrigeration Engineering Corp., 2024 Market St., Philadelphia 3, Pa.
Refrigeration Engineering Inc., 7250 E. Slauson Ave., Los Angeles 22, Calif.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 7, N. Y.
Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn 11, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo 6, O.
Reif-Rexoil, Inc., 37-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 667 Norwood Terrace, Elizabeth 2, N. J.
● Reinhard Brothers Co., 11-17 S. 9th St., Minneapolis 2, Minn.
Reintjes Co., Geo. P., 2517-19 Jefferson St., Kansas City, Mo.
Reliable Metal Engineering Co., 4336-4358 S. Knox, Chicago, Ill.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1058 Ivanhoe Rd., Cleveland 10, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
● Rempe Co., 362 N. Sacramento Blvd., Chicago 12, Ill.
Rensselaer Valve Co., Ontario St., Cohoes, N. Y.
Reps Tool Co., Inc., Box 5, Elmwood Branch, Hartford 10, Conn.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago, Ill.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Ave., Cleveland 13, O.
Republic Steel Corp., Steel & Tubes Div., 224 E. 131st St., Cleveland 8, O.
Research Corp., Chrysler Bldg. New York 17, N. Y.
● Research Products Corp., 1015 E. Washington Ave., Madison 10, Wis.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Belleville 9, N. J.
Revcor, not Inc., 3227 W. Carroll Ave., Chicago 24, Ill.
● Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Rex Clay Products Co., 14414 Dexter Blvd., Detroit, Mich.
Rex Welder & Engineering Co., 1910 Walnut, Kansas City 8, Mo.
Reynolds Electric Co., 2603 W. Congress St., Chicago 12, Ill.
Reynolds Mfg. Co., The, 412 Prospect St., N. E., Grand Rapids, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Reynolds Metals Co., 2500 S. 3rd St., Louisville 1, Ky.
Reznor Mfg. Co., Mercer 8, Pa.
Rheem Mfg. Co., 570 Lexington Ave., New York 22, N. Y.
Rhoads & Sons, J. E., 35 N. Sixth St., Philadelphia 6, Pa.
Rhode Island Fittings Co., cor. Dexter & Waverly Sts., Providence, R. I.
Rhode Island Humidifier & Ventilator Co., 99 Chauncy St., Boston 11, Mass.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Richfield Mfg. Corp., 139 S. Grand Ave., Baldwin, L. I., N. Y.
Richmond Engineering Co., Inc., 7th and Hospital Sts., Richmond, Va
Richmond Fireproof Door Co., Northwest F St., Richmond, Ind.
Richmond Radiator Co., 19 E. 47th St., New York 17, N. Y.
Richmont, Inc., 2810 E. 11th St., Los Angeles 23, Calif.
● Ric-wiL Co., Union Commerce Bldg., Cleveland 14, O.
● Ridge Tool Co., Clark St., Elyria, O.
Ridgefield Chemical Products Co., Inc., 705 Grand Ave., Ridgefield, N. J.
Rid-Sludge Div., Aulwood Mfg. Co., 77 Raymond Ave., St. Paul, Minn
Riggin Metal Products, Inc., Box 267, Kankakee, Ill.
Riggio Co., Frank D., 38 Orient Way, Rutherford, N. J.
Rigidbilt Inc., 2850 W. Fulton St., Chicago 12, Ill.
Rigid-Tex Corp., 658 Ohio St., Buffalo 3, N. Y.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Rinehart Inc., 511-513 Main St., Richmond, Ind.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Ristow, R. E., 2228 S. Atlantic Blvd., Los Angeles 22, Calif.
● Rittling Corp., The, 1292 Niagara St., Buffalo, N. Y.
Robbins & Myers, Inc., Lagonda Ave., Springfield, O.
Roberson Co., L. N., 1539 E. 103rd St., Seattle 55, Wash.
Robert Mfg. Co., 9035 Venice Blvd., Los Angeles 34, Calif.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo 7, N. Y.
Roberts Tube Works, 2500 Military Ave., Detroit 9, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa
Robinson Aviation, Inc., Vibrashock Div., Teterboro Air Terminal, Teterboro, N. J.
Robinson Insulation Co., Great Falls, Mont.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y
Rochester Mfg. Co., Inc., 63 Rockwood St., Rochester 10, N. Y.
Rock Fleece Co., 115 Durango St., El Paso, Tex.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.
Rockwell Co., W. S., 200 Eliot St., Fairfield, Conn.
Rockwood Mfg. Co., Inc., 1801-2001 English Ave., Indianapolis 6, Ind.
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Rodwell Engineering & Sales Co., 4303 Dodge St., Omaha, Neb.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg, Pittsburgh 15, Pa.
Rogers Air Conditioning Div., 724 Garrison Ave., New York 59, N. Y.
Roller Bearing Co. of America, Whitehead Rd., Trenton 3, N. J
Rolyan Metal Products, 2330 W. 58th St., Chicago 36, Ill.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Roots-Connersville Blower Corp., 900 W. Mount St., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus & Preble Aves., N. S. Pittsburgh, Pa.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1407 West Ave., Buffalo 13, N. Y.
Ross Sprinkler Co., 34 Roberts St., Pasadena 3, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Concrete Drill Co., 650 S. Arroyo Pkwy., Pasadena 2, Calif.
Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Calif.
Rotary Seal Co., 2020 N. Larrabee St., Chicago 14, Ill.
● Roth Co., Roy E., Rock Island, Ill.
Roto-Beam, 1755 N. Keeler Ave., Chicago 39, Ill.
Rotometals, Inc., 980 Harrison St., San Francisco 7, Calif.
Rotor Corp., Miamisburg, O.
Roy Co., Milton, 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif.
Royal Mfg. Corp., Waterloo, Ind.
Royal Ventilator Co., 415 Locust St., Philadelphia 6, Pa.
Royersford Foundry & Machine Co., Inc., 101-131 Main St., Royersford, Pa.
Roylyn, Inc., 716-718 W. Wilson Ave., Glendale 3, Calif.
Ruberoid Co., 500 Fifth Ave., New York, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 4 Foster Ct., P. O. Box 550, Salem, Mass.
● Rupp right, Siegfried, Box 6795, Los Angeles 22, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y
Russell Co., F. C., The, 1100 Chester Ave., Cleveland 1, O.
Russell Electric Co., 348 W. Huron St., Chicago 10, Ill.
Russell Mfg. Co., John M., Box 246, Naugatuck, Conn.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
Ruud Mfg. Co., 2934 Smallman St., Pittsburgh 1, Pa.

S

SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 32, Pa.
S.O.S. Products Co., Inc., 282 Nassau Ave., Brooklyn, N. Y.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
St. Clair Rubber Co., 440 E. Jefferson, Detroit, Mich.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., S. Wabasha and Water Sts., St. Paul 1, Minn.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kan.
Sall Bros. Co., 2320 Kishwaukee St., Rockford, Ill.
Sall Mountain Co., 176 W. Adams St., Chicago 3, Ill.
Salsbury Motors, Inc., 1201 E. Lexington St., Pomona, Calif.

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Sampsel Time Control, Inc., Spring Valley, Ill.
Sandee Mfg. Co., 5050 W. Foster Ave., Chicago, Ill.
● Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
● Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.
● Sarcotherm Controls, Inc., Empire State Bldg., New York 1, N. Y.
Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa.
Saunders Machine & Tool Corp., 25 Atherton St., Yonkers, N. Y.
Saval, Inc., 1915 E. 51st St., Los Angeles 11, Calif.
Saverite Engineering Co., 1030 Willow Ave., Hoboken, N. J.
Scaife Co., 26 Ann St., Oakmont, Pa.
Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaible Co., The, 1086 Summer St., Cincinnati 4, O.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
Schaub Engineering Co., Inc., Fred H., 2110 S. Marshall Blvd., Chicago 23, Ill.
Schecter Brothers Co., Hancock and Huntingdon Sts., Philadelphia 33, Pa.
Schieren Co., Chas. A., 30-38 Ferry St., New York 7, N. Y.
Schild Mfg. Co., 739 Broadway, Milwaukee, Wis.
Schmeig Industries, 312-320 Piquette Ave., Detroit 2, Mich.
Schnacke, Inc., 1016 E. Columbia St., Evansville, Ind.
Schneible Co., Claude B., 2827 25th St., Detroit 16, Mich.
Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schundler & Co., Inc., F. E., 45-15 Vernon Blvd., Long Island City, N. Y.
Schutte & Koerting Co., 12th and Thompson Sts., Philadelphia, Pa.
Schwitzer-Cummins Co., 1145 E. 22nd St., Indianapolis 7, Ind.
Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill.
Scientiae Tool Co., 101 Pine, Dayton, O.
Scientific Instrument Co., 1041 Second Ave., Detroit 26, Mich.
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Scovill Mfg. Co., Waterbury 91, Conn.
Scully Signal Co., 88 First St., Cambridge 41, Mass.
Sealed Power Corp., 500 Sanford St., Muskegon 61, Mich.
Sealol Corp., 45 Willard Ave., Providence 5, R. I.
Seamlex Co., Inc., 41-23 24th St., Long Island City 1, N. Y.
Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa.
● Sellers Engineering Co., 4874-76 N. Clark St., Chicago 40, Ill.
Semco Mfg. Co., 118-122 Third Ave., N., Nashville, Tenn.
Semet-Solvay Engineering Corp., 40 Rector St., New York 6, N. Y.
Semler Co., Jeannette, Pa.
Sensenich Corp., Adjacent to Lancaster Municipal Airport, Lancaster, Pa.
Servel, Inc., Electric Refrigeration Div., 119 Morton Ave., Evansville 20, Ind.
Service Metal Fabricators, Inc., 2350 W. 58th St., Chicago 36, Ill.
Service To Industry, Box 133, West Hartford, Conn.
Shafco Distributing Corp., 1354 Book Bldg., Detroit 26, Mich.
Shafer Bearing Corp., 801 Burlington Ave., Downers Grove, Ill.
Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 43, Pa.
Shallcross Controls, Inc., 2217-21 N. 31st St., Milwaukee 8, Wis.
Shank Co., Cyrus, 625 W. Jackson Blvd., Chicago 6, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del.
Shaw-Kendall Engineering Co., 128 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., 201 E. Carson St., Pittsburgh 22, Pa.
Sheet Metal Mfg. Co., Inc., 953 Myrtle Ave., Brooklyn 6, N. Y.
Sheetlock Co., 4521 N. Clark St., Chicago, Ill.
Sheffler-Gross Co., Drexel Bldg., Philadelphia 6, Pa.
Sherwin-Williams Co., The, 101 Prospect Ave., N. W., Cleveland, O.
Sight Feed Generator Co., 14-18 N. 10th St., Richmond, Ind.
Signal Electric Mfg. Co., Menominee, Mich.
Signal Indicator Co., 894 Broadway, New York 3, N. Y.
Silvercote Products, Inc., 161 E. Erie St., Chicago, 11, Ill.
Simplex Ceiling Co., 552 W. 52nd St., New York 19, N. Y.
Simplex Heating Specialty Co., Inc., 954 Cabell St., Lynchburg, Va.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 11 Park Pl., New York 7, N. Y.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4, Ind.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010, Pittsburgh 16, Pa.
Skaneateles Mfg. Co., Inc., 122 Dickerson St., Syracuse 2, N. Y.
● Skidmore Corp., St. Joseph, Mich.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., South Bend 21, Ind.
Skinner Electric Valve Div., 40 Belden Ave., Norwalk, Conn.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., 1948 N. 9th St., St. Louis 6, Mo.
Skinner Irrigation Co., 1211 E. Canal St., Troy, O.
Skuttle Mfg. Co., 4099 Beaufait, Detroit 7, Mich.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, O.
Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill.
● Smith Co., Inc., H. B., The, 64 Main St., Westfield, Mass.
Smith Co., J. B., 3327 B St., Philadelphia 34, Pa.
Smith Co., O. F., Moline, Ill.
Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis.
Smith Corp., Winfield, H., 144 Eaton St., Springfield, Erie County, N. Y.
Smith Heater Co., Peter, 10501 Haggerty, Dearborn, Mich.
Smith, Inc., James Campbell, Station St., Mentor, O.
Smith & Kanzler Corp., E. Linden Ave., Linden, N. J.
Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
Smith Twin Tubular Boiler Co., Inc., Cottman St., at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-on Tools Corp., Kenosha, Wis.
Snyder Sales Corp., 5225 Wilshire Blvd., Los Angeles 36, Calif.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N.Y.
Sola Electric Co., 4633 W. 16th St., Chicago, Ill.
Soldering Specialties Co., Summit, N. J.
Solvay Sales Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Wks., Somerville, N. J.
Sonneborn Sons, Inc., L., 88 Lexington Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
Soreng Mfg. Co., 1903 N. Clybourn Ave., Chicago, Ill.
● South Bend Air Products, Inc., 304 E. Colfax Ave., South Bend 22, Ind.
South Chester Tube Co., Front & Thurlow Sts., P. O. Box 60, Chester, Pa.
Southbridge Roofing Co., Inc., Hartwell and Chapin St., Southbridge, Mass.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southern States Iron Roofing Co., Stiles Ave. & Louisville Rd., Savannah, Ga.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
● Spang-Chalfant, Div. of National Supply Co., Grant Bldg., Pittsburgh 30, Pa.
Spartan Tool Co., 6007 N. Lincoln Ave., Chicago 45, Ill.
Special Chemicals Corp., 30 Irving Pl., New York 3, N. Y.
Speedway Mfg. Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
Spence Engineering Co., Inc., 32 Grant St., Walden 6, N. Y.
Spencer Heater Div., Avco Mfg. Corp., 164 Park St., Williamsport 19, Pa.
Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sponge Rubber Products Co., Shelton, Conn.
● Sporlan Valve Co., Sporlan Bldg., 7525 Sussex Ave., St. Louis 17, Mo.
Spray Engineering Co., 114 Central St., Somerville 45, Mass.
● Spraying Systems Co., 3219 Randolph St., Bellwood (Chicago Suburb), Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Springfield Boiler Co., 1939 E. Capitol Ave., Springfield, Ill.
Sprout-Waldron & Co., Muncy, Pa.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, E. 40th St., & Kelley Ave., Cleveland 3, O.
Standard Asbestos Mfg. Co., 860 W. Evergreen Ave., Chicago 22, Ill.
Standard Electric Mfg. Co., West Berlin, N. J.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., S., Detroit 17, Mich.
Standard Furnace & Supply Co., 413-17 S. Tenth St., Omaha 8, Neb.
Standard Heater & Oil Equipment Co., 245 Cornelison Ave., Jersey City 2, N. J.
Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.
Standard Machine & Mfg. Co., 8213-15 Gravois Ave., St. Louis 23, Mo.
Standard Motor Corp., Elyria, O.
Standard Pressed Steel Co., Jenkintown, Pa.
Standard Reseater Corp., 423 W. 126th St., New York 27, N. Y.
Standard Rolling Mills, Inc., 193 Newell St., Brooklyn 22, N. Y.
● Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32, Ill.
Standard Thermometer, Inc., 952 Dorchester Ave., Boston 25, Mass.
Standard Transmission Equipment Co., 78 W. Union St., Pasadena 1, Calif.
Standard Tube Co., 24400 Plymouth Rd., Detroit 28, Mich.
Standard Ventilator Co., Lewisburg, Pa.
Stanley Electric Tools, Div. of The Stanley Works, Myrtle St., New Britain, Conn.
Stanley Works, The, 195 Lake St., New Britain, Conn.
Staples & Pfeiffer, 528 Bryant St., San Francisco 7, Calif.
Star Electric Motor Co., 200 Bloomfield Ave., Bloomfield, N. J.
Star Expansion Bolt Co., 147 Cedar St., New York 6, N. Y.
Sta-Rite Products, Inc., Delavan, Wis.
Star Mfg. Co., Inc., 530 Kinsley Ave., Providence, R. I.
Star Products Co., 130 Walnut Ave., New York 54, N. Y.
Star Tubular Products Co., 4747 S. Richmond St., Chicago, Ill.
Starr Piano Co., Richmond, Ind.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Steamaire Co., Cincinnati 2, O.
Stedco Products, 292 Wyoming Ave., Kingston, Pa.
Steel City Electric Co., 1201 Columbus Ave., Pittsburgh, Pa.
Steel Improvement & Forge Co., 974 E. 64th St., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
● Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.
Sterling Electric Motors, Inc., 5401 Anaheim Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
● Sterling, Inc., 3738 N. Holton St., Milwaukee 12, Wis.
Sterling Radiator Co., Westfield, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Stewart Ice Machine Co., 1282 W. 1st St., Pomona, Calif.
● Stewart Mfg. Co., Inc., 610 Bloomfield Ave., Bloomfield, N. J.
Stewart-Warner Corp., 1826-1852 Diversey Parkway, Chicago 14, Ill.
● Stic-Klip Mfg. Co., 50 Regent St., Cambridge 40, Mass.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 1, Ind.
Stockham Valves & Fittings Co., 4100 Tenth Ave., N., Birmingham 2, Ala.
Stokes Machine Co., F. J., 5910 Tabor Rd., Philadelphia 20, Pa.

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Stokes Molded Products, Taylor & Webster, Trenton 4, N. J.
Stokol Stoker Co., Inc., 2060 Northwestern Ave., Indianapolis 7, Ind.
Stout & Sons, David, 7016 Manchester Blvd., St. Louis 17, Mo.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, 218 S. Geddes St., Syracuse 4, N. Y.
Strandwitz & Co., Inc., W. J., Jefferson and Master Sts., Camden, N. J.
Stratford Pipe Scalloper Machine Co., 49 Oakland Pl., Stratford, Conn.
Streine Tool & Mfg. Co., New Bremen, O.
● Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, O.
Struthers-Dunn, Inc., 150 N. 13th St., Philadelphia 7, Pa.
Struthers Wells Corp., Titusville, Pa.
Stuart Co., W. W., 417 Ninth St., Des Moines 9, Iowa.
● Sturtevant Co., B. F., Div. of Westinghouse Electric, 107 Readville Ave., Hyde Park, Boston 36, Mass.
Sturtevant Co., P. A., Addison, Ill.
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., 1143 E. Jersey St., Elizabeth 4, N. J.
Sundstrand Machine Tool Co., Hydraulic Div., 2531 11th St., Rockford, Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Sunroc Refrigeration Co., Glen Riddle, Pa.
Super Mold Corp., 402 N. Sacramento St., Lodi, Calif.
Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.
Super Radiator Corp., 6714 Walker St., St. Louis Park, Minneapolis 16, Minn.
Superior Combustion Industries, Inc., Emmaus, Pa.
Superior Railway Products Corp., 7501 Thomas Blvd., Pittsburgh, Pa.
Superior Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Supersonics Corp. of America, 231 E. 47th St., New York, N. Y.
Supreme Air Filter Co., 126 W. 21st St., New York, N. Y.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
● Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Corp, O. A., 1812 W. Second St., Wichita 2, Kan.
Swaby Mfg. Co., 3818 W. Armitage Ave., Chicago 47, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
Swallow Airplane Co., Wichita, Kan.
● Swartwout Co., 18511 Euclid Ave., Cleveland 12, O.
Swett & Co., George E., 256 Mission St., San Francisco, Calif.
Swift Lubricator Co., 19 James Bldg., Elmira, N. Y.
Swift Mfg. Co., Inc., 247 McDougall Ave., Detroit 7, Mich.
Syncromatic Corp., Watertown, Wis.
Synchro-Start Products, Inc., 1046 W. Fullerton Ave., Chicago 14, Ill.
Syntron Co., Homer City, Pa.

T

Taber Pump Co., 272 Elm St., Buffalo 3, N. Y.
Taco Heaters, Inc., 137 South St., Providence, R. I.
Tagliabue Corp., C. J., 614 Frelinghuysen Ave., Newark 5, N. J.
● Tal Bender, Inc., 417 N. Water St., Milwaukee 2, Wis.
Tallmadge & Co., Webster, 364 Glenwood Ave., East Orange, N. J.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.
● Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., Charles, 715 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Ply-Woods, 228 N. LaSalle St., Chicago 1, Ill.
Techtmann Industries, Inc., 714 W. Wisconsin Ave., Milwaukee 1, Wis.
Tecumseh Products Co., Tecumseh, Mich.
Telechron, Inc., Ashland, Mass.
Telsit Insulation Co., 1933 West Farms Rd., Bronx 60, N. Y.
Temp-Control, Inc., 208 State St., Peoria, Ill.
Templeton Bros., 177 Reservation Rd., Hyde Park 36, Mass.
Tempo Products Co., 1900 Euclid Ave., Cleveland 15, O.
Temprite Products Corp., 47 Piquette Ave., Detroit 2, Mich.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Brown-Marx Bldg., Birmingham 2, Ala.
Tennessee Products and Chemical Corp., American National Bank Bldg., Nashville, Tenn.
Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.
Terra-Temp Co., Inc., Circle Bldg., Indianapolis 4, Ind.
● Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Textite Corp., 2110 Roscoe St., Chicago 18, Ill.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermal Co., Inc., 1434 N. Fourth St., Milwaukee, Wis.
Thermal Engineering Co., 2967 S. LaSalle St., Chicago 16, Ill.
Thermal Industries, Box No. 725, Indio, Calif.
Thermix Corp., The, First National Bank Bldg., Greenwich, Conn.
Thermoid Co., Trenton, N. J.
Thomas Co., Arthur H., W. Washington Square, Philadelphia, Pa.
Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.
Thompson & Son Co., The Henry G., 277 Chapel St., New Haven, Conn.
Thompson Research & Mfg. Co., Davenport, Fla.
Thomson Electric Welder Co., 161 Pleasant St., Lynn, Mass.
Thomson Industries, Inc., Manhasset, N. Y.
Threadwell Tap & Die Co., Greenfield, Mass.
Three Point Industries, 3767 N. Racine Ave., Chicago 13, Ill.
● Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Ave., Philadelphia 44, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Tiffin Eaves Trough Clamp Co., 25 Miami, Tiffin, O.
● Tilco-Fin-Tubing Div., David E. Kennedy, Inc., 58 Second Ave., Brooklyn 15, N. Y.
Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, O.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
Tinnerman Products, Inc., 2018 Fulton Rd., Cleveland 13, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.
● Titus Mfg. Corp., 113 E. 8th St., Waterloo, Iowa
Titusville Iron Wks. Co., The, Titusville, Pa.
Todd Shipyards Corp., Combustion Equipment Div., 81-16-45th Ave., Elmhurst, L. I., N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torq Electric Mfg. Corp., 1006 Interstate St., Bedford, O.
Torrington Co., The, Bantam Bearings Div., South Bend 21, Ind.
Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Trade-Wind Motorfans, Inc., 5725 S. Main St., Los Angeles 37, Calif.
Trageser Copper Wks., Inc., 5000 Grand Ave., Maspeth, Long Island, N. Y.
● Trane Co., The, La Crosse, Wis.
Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.
● Trent Tube Mfg. Co., 430 Church St., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
Tri-Clover Machine Co., 2809 60th St., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., 55-71 Amory St., Roxbury, Boston 19, Mass.
Trimount Instrument Co., 37 W. Van Buren St., Chicago 5, Ill.
Trimount Rotary Power Co., 189 Cedar St., Dedham, Mass.
Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill.
Trion, Inc., McKees Rocks, Pa.
Triplex Heating Specialty Co., Inc., 252 N. Grant, Peru, Ind.
Trombetta Solenoid Co., 329 N. Milwaukee St., Milwaukee 2, Wis.
Tropical Paint & Oil Co., 1244-82 W. 70th St., Cleveland 2, O.
Troy Engine & Machine Co., 5 Railroad Ave., Troy, Pa.
Truetite Corp., The, 36 Union Ave., Bridgeport 7, Conn.
Truflo Fan Co., 523 Main St., Harmony, Pa.
Tru-Line Corp., 1725 Clover Field Blvd., Santa Monica, Calif.
Trumbull Electric Mfg. Co., The, Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff and Grand Trunk R. R., Detroit 11, Mich.
Truscon Steel Co., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Railroad Sq., Westfield, Mass.
● Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Tubing Seal-Cap, Inc., 2810 E. 11th St., Los Angeles 23, Calif.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
Turnbull Mfg. & Dist. Co., 9930 Freeland Ave., Detroit 27, Mich.
Turner Brass Wks., The, 821-47 Park Ave., Sycamore, Ill.
Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill.
● Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
Tweco Products Co., P. O. Box 666, Wichita 1, Kan.
Twentieth Century Heating & Ventilating Co., 96 Ira Ave., Akron 1, O.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., 794 Union St., Brooklyn 15, N. Y.

U

U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif.
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 14, O.
U. S. Expansion Bolt Co., P. O. Box 827, State St. & P. R. R., York, Pa.
U. S. Gutta Percha Paint Co., 43 Dudley St., Providence 1, R. I.
U. S. Machine Corp., Lebanon, Ind.
U. S. Pipe & Mfg. Co., 249 First St., San Francisco 5, Calif.
U. S. Plug & Fitting Co., 305 Frederick Bldg., Cleveland 15, O.
USHCO Mfg. Co., Inc., 135 Tonawanda St., Buffalo 7, N. Y.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
Ultrasonic Corp., 61 Rogers St., Cambridge 42, Mass.
Una Welding, Inc., 1615 Collamer Ave., E., Cleveland 10, O.
Unexcelled Mfg. Co., Inc., 11 Park Pl., New York 7, N. Y.
Unified Air Conditioner Co., Terry Bldg., Duluth, Minn.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Union Asbestos & Rubber Co., 54th Ave. and 18th St., Cicero 50, Ill.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Metal Wks., 128 Carter St., Chelsea 50, Mass.
Union Steam Pump Co., Capitol Ave., S. W., Battle Creek, Mich.
Union Water Meter Co., 333 Hermon St., Worcester, Mass.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.
United Cinephone Corp., Torrington, Conn.
● United Cooling Tower Co., 406 W. 34th St., Kansas City, Mo.
United Cork Companies, Central Ave., Kearny, N. J.
United Electric Controls Co., 85 School St., Watertown, Mass.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.
● United States Air Conditioning Corp., 33rd & Como Ave., S. E., Minneapolis 14, Minn.
United States Gasket Co., 1518 Pierce Ave., Camden, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

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United States Mineral Wool Co., South Milwaukee, Wis.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Pipe & Foundry Co., Burlington, N. J.
United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y.
● United States Steel Export Co., New York, N. Y.
● United States Steel Supply Co., 1319 W. Wabansia, Chicago, Ill.
United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y.
Universal Air Filter Corp., 332 W. Michigan St., Duluth 2, Minn.
Universal Cooler, Div. of International Detrola Corp., 299 Joseph St., Marion, O.
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Gypsum & Lime Co., 111 W. Washington St., Chicago, Ill.
Universal Power Corp., 731 Carnegie Ave., Cleveland 15, O.
Universal Welder Corp., 731 Carnegie Ave., Cleveland 15, O.
Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass.
Utica Products, Inc., Utica 4, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.
● Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 11, Calif.
Utility Laboratory, Inc., 330 36th St., Brooklyn 32, N. Y.

V

V-Belt Clutch Co., 3757 Wilshire Blvd., Los Angeles 5, Calif.
V-Mac Industries, Guilford, Conn.
Vacuum-Electronic Engineering Co., 316 37th St., Brooklyn 32, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanderman Mfg. Co., Mansfield Ave., Willimantic, Conn.
Van Dorn Electric Tool Co., Towson, Md.
Van Noorden Co., E., 100 Magazine St., Boston 19, Mass.
Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.
Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill.
Vapor Specialty Co., 101 W. 42nd St., New York 18, N. Y.
Ventilating Products Co., 2800 Cottage Grove Ave., Chicago, Ill.
Verson Allsteel Press Co., 93rd & Kenwood Ave., Chicago 19, Ill.
Vesco Corp., 1381 Sedgwick Ave., New York 52, N. Y.
Vibration Eliminator Co., 10-28 47th Ave., Long Island City 1, N. Y.
Victaulic Co. of America, 30 Rockefeller Plaza, New York 20, N. Y.
Victor Electric Products, Inc., 2950 Robertson Rd., Cincinnati 9, O.
Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif.
Viking Air Conditioning Corp., 5600 Walworth Ave., Cleveland 2, O.
Viking Mfg. Corp., 1747 Chester Ave., Cleveland 14, O.
Viking Pump Co., Fourth and Rouse Sts., Cedar Falls 1, Ia.
Viking Shear Co., 1063 W. 19th St., Erie, Pa.
Vilter Mfg. Co., The, 2148 S. First St., Milwaukee 7, Wis.
Vinco Co., Inc., The, 305 E. 45th St., New York 17, N. Y.
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Virginia Smelting Co., West Norfolk, Va.
Vogt Machine Co., Henry, 1000 W. Ormsby St., Louisville 10, Ky.
Voss Co., Inc., J. H. H., 785 E. 144th St., Corner of Wales Ave., New York 54, N. Y.
Vulcan Electric Co., 88-90 Holten St., Danvers, Mass.
● Vulcan Radiator Co., 26 Francis Ave., Hartford 6, Conn.

W

W. G. B. Oil Clarifier, Inc., Kingston, N. Y.
W-H Engineering Co., 4102 S. LaSalle St., Chicago 9, Ill.
Wabash Mfg. Co., 2642 S. Michigan Ave., Chicago 16, Ill.
Wade Mfg. Co., Elgin, Ill.
Wagner Awning & Mfg. Co., 2658 Scranton Rd., Cleveland, O.
● Wagner Electric Corp., 6370 Plymouth Ave., St. Louis 14, Mo.
Waldron Corp., John, New Brunswick, N. J.
Wall Chemicals Div. of The Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Wallace Supplies Mfg. Co., 1304-12 Diversey Pkwy., Chicago 14, Ill.
Wallace & Tiernan Co., Inc., P. O. Box 178, Newark 1, N. J.
Walsh Co., The, 420 Boylston St., Boston 16, Mass.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Walsh Refractories Corp., 4070 N. First St., St. Louis 7, Mo.
Walton Co., Box 5, Elmwood Branch, Hartford 10, Conn.
Walton Laboratories, Inc., 1186 Grove St., Irvington 11, N. J.
● Walworth Co., 60 E. 42nd St., New York 17, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
● Ward Leonard Electric Co., 24 South St., Mt. Vernon, N. Y.
Warlo Corp., 330 W. 42nd St., New York 18, N. Y.
● Warner Ventilator Co., 225 Spring St., La Grange, Ind.
Warren Foundry & Pipe Corp., 11 Broadway, New York 4, N. Y.
Warren Steam Pump Co., Inc., 300 Bridges Ave., Warren, Mass.
Washburne & Co., E. G., 207 Fulton St., New York, N. Y.
Washington Steel Corp., Griffith Ave., Washington, Pa.
Water Cooling Corp., 71 Nassau St., New York 7, N. Y.
Water Cooling Equipment Corp., New Hampshire Ave. & Weber Rd., Affton Station, St. Louis 23, Mo.
Water Cooling Tower Co., 5501 Cornell Ave., Chicago, Ill.
Water Refining Co., 1123 Barthold, Ft. Wayne, Ind.
Water Service Laboratories, Inc., 423 W. 126th St., New York 27, N. Y.
Water Treatment Company of America, 1159 Hodgkiss St., Pittsburgh 12, Pa.
Waterfilm Boilers, Inc., 154 Ogden Ave., Jersey City 7, N. J.
Watson & McDaniel Co., 440 N. Marshall, Philadelphia 23, Pa.
Watson-Standard Co., 225 Galveston Ave., Pittsburgh 30, Pa.
Watson-Stillman Co., 140 Aldene Rd., Roselle, N. J.
Watts Regulator Co., 10 Embankment St., Lawrence, Mass.
Waukesha Motor Co., Waukesha, Wis.
Waverly Heating Supply Co., 31 Union St., Boston 8, Mass.
Wayne Davies & Co., Westboro, Mass.
Wayne Home Equipment Co., Inc., Fort Wayne, Ind.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Weaver Mfg. Co., Springfield, Ill.
Webb Co., The, Webb City, Mo.
Webb Machine & Tool Co., P. O. Box 274, Coraopolis, Pa.
Webber Engrg. Corp., 411 Board of Trade Bldg., Indianapolis, Ind.
● Webster & Co., Warren, 1664 Federal St., Camden, N. J.
Webster Electric Co., S. W. Corner Clark & De Koven Aves., Racine, Wis.
● Webster Engineering Co., 419 W. Second St., Tulsa 1, Okla.
Wedge Protectors, Inc., 3985 Jennings Rd., Cleveland 9, O.
Weil-McLain Co., Michigan City, Ind.
● Weil Pump Co., 1528 N. Fremont St., Chicago 22, Ill.
● Weinman Pump Mfg. Co., The, 290 W. Spruce St., Columbus 8, O.
● Weirton Steel Co., Weirton, W. Va.
Weiss & Co., H., 113-115 Mercer St., New York, N. Y.
Weksler Thermometer Corp., 52-56 W. Houston St., New York 12, N. Y.
Weldex, Inc., 7326 McDonald Ave., Detroit, Mich.
Welding Apparatus Co., 2750 W. Van Buren St., Chicago, Ill.
Welding Service Co., 1309 E. Waterman, Wichita, Kan.
Welsbach Corp., The, Kitson Div., 1500 Walnut St., Philadelphia, Pa.
Welsbach Corp., The, Ozone Processes Div., 1500 Walnut St., Philadelphia, Pa.
West Coast Electrical Mfg. Co., 10010 S. Main St., Los Angeles 3, Calif.
Western Blower Co., 1800 Airport Way, Seattle 4, Wash.
Western Brass Mills Div. of Olin Industries, Inc., East Alton, Ill.
Western Chemical Co., 713 Washington St., Kansas City 6, Mo.
Western Engineering & Mfg. Co., 1726 E. Washington Blvd., Los Angeles 21, Calif.
Western Felt Works, 4029-4117 Ogden Ave., Chicago 23, Ill.
Western Hanger Co., 55 New Montgomery St., San Francisco, Calif.
Western Lithograph Co., 600 E. 2nd St., Los Angeles 54, Calif.
Western Mineral Products Co., 2602 Ed Creighton Ave., Omaha 1, Nebr.
Western Piping & Engineering Co., 119 Kansas St., San Francisco 3, Calif.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.
Western Thermal Equipment Co., 1701 W. Slauson Ave., Los Angeles 44, Calif.
Western Wire & Iron Works, Inc., 957 W. 18th Pl., Chicago 8, Ill.
Western Wire Products Co., 1415-35 S. 18th St., St. Louis 4, Mo.
Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.
Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Newark 5, N. J.
● Wheatland Tube Co., 1300 Bankers Securities Bldg., Philadelphia 7, Pa.
Wheelco Instruments Co., Harrison and Peoria Sts., Chicago 7, Ill.
Wheeler Mfg. Co., C. H., 1739 Sedgley Ave., Philadelphia 32, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va.
Whirlaway Motors, Inc., Tipp City, O.
White Flomatic Corp., P. O. Box 267, Hoosick Falls, N. Y.
White Mfg. Co., 2362 University Ave., St. Paul 4, Minn.
White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo.
Whiteley Bearing Corp., 1283 S. Ashland Ave., Chicago, Ill.
Whitewater Products Inc., 1715 W. Lake St., Chicago, Ill.
Whiting Corp., Harvey, Ill.
Whiting Fire Power Products Corp., 1501 N. First St., Superior, Wis.
● Whitlock Mfg. Co., 44 South St., Hartford 1, Conn.
Whitney Chain & Mfg. Co., The, 237 Hamilton St., Hartford 2, Conn.
Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.
Whittaker Co., Wm. R., 915 N. Citrus, Los Angeles, Calif.
Whittington Pump & Engineering Corp., 1126 Prospect, Indianapolis 3, Ind.
Whitty Co., Inc., 86 Western Ave., Boston 34, Mass.
Wickes Boiler Co., 502 N. Water St., Saginaw, Mich.
Wickes Bros., 500 N. Tilden St., Saginaw, Mich.
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., 361 Delaware Ave., Buffalo 2, N. Y.
Wiedemann Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa.
Wiegand Co., Edwin L., 7610 Thomas Blvd., Pittsburgh 8, Pa.
Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif.
Wilbur & Williams Co., Greenleaf & Leon Sts., Boston 15, Mass.
Wilcolator Co., 1001 Newark Ave., Elizabeth B, N. J.
Wilhelm Co., A., 3rd and Bern Sts., Reading, Pa.
Will Corp., 35 Russell St., Rochester 3, N. Y.
Will-Burt Co., The, Orrville, O.
Williams & Co., J. H., Buffalo 7, N. Y.
Williams Gauge Co., The, 1620 Pennsylvania Ave., N. S., Pittsburgh 12, Pa.
Williams, Inc., F. C., 6661 Chase Rd., Dearborn, Mich.
Williams Oil-O-Matic Div., Eureka Williams Corp., 1201 East Bell, Bloomington, Ill.
Williams & Son, I. B., Dover, N. H.
Williams Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati 25, O.
Williamson Heater Co., 4558 Marburg Ave., Cincinnati 9, O.
Willis Steel Corp., 156 N. Academy St., Galesburg, Ill.
Willson Products, Inc., 348 Thorn St., Reading, Pa.
Will-Weld Mfg. Co., Inc., 1533 Marcy St., Omaha 2, Nebr.
Wiley's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich.

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● Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago 9, Ill.
Wilson Co., H. A., The, 105 Chestnut St., Newark, N. J.
Wilson Co., K. R., 215 Main St., Buffalo, N. Y.
Wilson Engineering Corp., 122 S. Michigan Ave., Chicago 3, Ill.
● Wilson, Inc., Grant, 141 W. Jackson Blvd., Chicago 4, Ill.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York 17, N. Y.
Wind-Way Fan & Ventilator Co., 527 St. Joseph St., New Orleans 13, La.
● Wing Mfg. Co., L. J., 14th St. & 7th Ave., New York 11, N. Y.
Winkler & Sons, Inc., A. E., 2337 N. 31st St., Milwaukee 10, Wis.
Winslow Engineering Co., 4069 Hollis, Oakland 8, Calif.
Wiss & Sons Co., J., 33 Littleton Ave., Newark 7, N. J.
Witte Engine Works, Div. of Oil Well Supply Co., 1600 Oakland St., Kansas City 3, Mo.
Wittenmeier Machinery Co., 850-860 N. Spaulding Ave., Chicago 51, Ill.
Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill.
Wolfe-Kote Co., Inc., 820 Penn Ave., Sheboygan, Wis.
● Wolverine Tube, Div. of Calumet and Hecla Consolidated Copper Co., 1419 Central Ave., Detroit 9, Mich.
Wood Conversion Co., 1981 First National Bank Bldg., St. Paul 1, Minn.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.
Wood Steel Co., Alan, Conshohocken, Pa.
Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
Worner Electronic Devices, Rankin, Ill.
Worthington Pump & Machinery Corp., Dunellen, N. J.
● Worthington Pump & Machinery Corp., Harrison & Worthington Sts., Harrison, N. J.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Worthington-Gamon Meter Co., Newark, N. J.
Wright-Austin Co., 315 W. Woodbridge St., Detroit 26, Mich.
Wysong & Miles, 625 Fulton St., Greensboro, N. C.

X

X L Refrigerating Co., 1834 W. 59th St., Chicago 36, Ill.
X Laboratories, Inc., 25 W. 45th St., New York 19, N. Y.
X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.

Y

Yale & Towne Mfg. Co., Stamford, Conn.
Yardley Plastics Co., 138 Parsons Ave., Columbus 15, O.
● Yarnall-Waring Co., 107 Mermaid Ave., Philadelphia 18, Pa.
Yates-American Machine Co., Beloit, Wis.
Yeomans Bros. Co., 1471 N. Dayton St., Chicago 22, Ill.
York Corp., Roosevelt Ave., York, Pa.
York Corrugating Co., Adams St. & W. M. R. R., York, Pa.
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.
York-Shipley, Inc., York, Pa.
Yost Mfg. Co., Meadville, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14, O.
● Young Radiator Co., 709 S. Marquette St., Racine, Wis.
Young Regulator Co., 5209 Euclid Ave., Cleveland 3, O.
● Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.
Yula Water Heaters, Inc., 166 W. 225th St., New York, N. Y.

Z

● Zallea Brothers, Taylor and Locust St., Wilmington 99, Del.
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark 5, N. J.
Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill.
● Zink Co., John, P. O. Box 310, Tulsa 1, Okla.
Zone-Heat Regulator Co., Box 188, Garrettsville, O.
● Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill.

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